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BIOSTRATIGRAPHY AND SYSTEMATICS OF LATE MIDDLE TO LATE TRIASSIC RADIOLARIANS FROM THE TAURUS MOUNTAINS AND ANKARA REGION, TURKEY

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With 30 figures and 47 plates

ABSTRACT

In this study, the biostratigraphy and systematics of late middle to late Triassic Radiolarians are investigated in four measured sections from the different parts of the Antalya and Beysehir-Hoyran Nappe in the western and central part of the Taurus Mountains and one sample from the Ankara Ophiolitic Melange. Furthermore, general stratigraphy of the Antalya Nappes in the Taurus Mountains are evaluated and revised by means of individual age determinations of Radiolarians from different parts of this nappe.

The Antalya Nappes include a package of intensively sliced allochthonous units with distinctive lithostratigraphic features. The Alakircay Nappe is one of the tectonic units characterized by the presence of more or less well-developed middle to late Triassic successions. Two sections were measured from different slices of the Alakircay Nappe. The Sugozu Measured Section is mainly represented by an alternation of cherts, silicified mudstones and mudstones with diverse, moderate to well preserved late Ladinian- early Carnian Radiolarians. Radiolarian assemblages of the Sugozu Measured Section indicate the *Muelleritortis cochleata, Tritortis kretaensis* and unnamed zones proposed by Kozur & Mostler (1994, 1996b) due to presence of index-species.

The Yaylakuzdere Measured Section is mainly characterized by ocean floor basalts overlain by an alternation of pelagic limestones and shales at the base and cherty limestones at the top with diverse, mainly well preserved, pyritizied latest Carnian to early Norian Radiolarians. Three conodont zones are determined within the pelagic limestones, namely the *Epigondolella primitia* (latest Carnian-earliest Norian), the *Epigondolella abneptis* (early Norian) and the *Epigondolella triangularis* Zones (upper part of early Norian). Detail of the associated radiolarian fauna correspond to these conodont zones are submitted.

Third section (the Dikmetas Measured Section) from the Antalya Nappes is measured in the Cataltepe Nappe. It is made up of an alternation of sandstones and shales with biohermal limestone intercalations overlain by an alternation of pelagic limestones and cherts with moderately preserved Rhaetian- early Liassic Radiolarians. The radiolarian fauna from the basal part of the Rhaetian in this section correspond to 2b and 2c Assemblages proposed by Carter (1993) while the fauna of the upper part of Rhaetian could correspond to Assemblage 3 proposed by Carter (1993). The radiolarian assemblages of the early Jurassic part of the Dikmetas Measured Section is represented by *Parahsuum simplum* YAO and associated fauna which are very characteristic for this time interval.

The fourth section, the Haciyunuslar Measured Section, is from the Huglu Unit of the Beysehir-Hoyran Nappe in the Taurus Mountains. It is mainly characterized by an alternation of tuffs, tuffites and basic volcanics with limestone intercalations overlain by late Triassic-late Cretaceous pelagic sediments. Moderately preserved but highly diverse middle Carnian radiolarian fauna have been

recovered from red, thin pelagic limestone levels at the basal part of the section. Radiolarian assemblages of this limestone indicate *Tetraporobrachia haeckeli* Zone established by Kozur & Mostler (1994) with respect to the presence of index-species.

In addition to these four sections situated at the Taurus Mountains, the radiolarian assemblage of the late Norian block which comprises an alternation of cherts and mudstones from Ankara Ophiolitic Melange around Ankara region is also considered. Radiolarian assemblages of this block clearly indicate *Betraccium deweveri* Subzone of *Betraccium* Zone proposed by Blome (1984) due to presence of index-species.

In this study, 284 species, subspecies and 48 taxa belonging to open nomenclature are investigated. 70 species and 5 subspecies are described as new. These taxa belong to 115 genera (14 of them are new, namely *Dicapnuchosphaera, Monocapnuchosphaera, Nodocapnuchosphaera, Paricrioma, Braginastrum, Pseudogodia, Tauridastrum, Tricornicyrtium, Alatipicapora, Kozuricyrtium Praeprotunuma, Senelella, Mostlericyrtium, Papiliocampe*) and 41 family. A comprehensive list of determined taxa is submitted.

BIOSTRATIGRAPHIE UND SYSTEMATIK SPÄT-MITTELTRIASSISCHER BIS OBERTRIASSISCHER RADIOLARIEN AUS DEM TAURUS GEBIRGE UND DER ANKARA REGION, TÜRKEI

ZUSAMMENFASSUNG

In dieser Studie wurde die Biostratigraphie und die Systematik spät-mitteltriassischer bis hoch-obertriassischer Radiolarien untersucht, und zwar in 4 aufgemessenen Profilen verschiedener Breiche der Antalya und Beysehir-Hoyran Decken, im westlichen und zentralen Teil des Taurus Gebirges und eine Probe wurde aus der Ankara Ophiolit Melange untersucht. Weiters wurde generell die Stratigraphie der Antalya-Decken im Taurus Gebirge erfaßt und vor allem die bisherige Stratigraphie mit Hilfe von Radiolarienaltern in verschiedenen Bereichen dieser Decken revidiert.

Die Antalya-Decken beinhalten eine Schichtfolge von intensivst tektonisch zerlegten allochtonen-Einheiten mit disdinktiven litostratigraphischen Merkmalen. Die Alakircay-Decke ist charakterisiert durch die Präsenz von einer mehr oder minder gut entwickelten mittel-bis spättriassischen Abfolge. 2 Profile wurden aus verschiedenen Teildecken der Alakircay-Decke aufgemessen. Die Sugozu Bereich wird hauptsächlich durch eine Wechsellagerung von Kiesellagen und Kieselknauern sowie silifizierten Tonsteinen und Tonsteinen charakterisiert, die eine sehr gut erhaltene spätladinische bis frühkarnische Radiolarienfauna aufweist. Die Radiolarienzusammensetzung des Sugozu Profils ist charakterisiert durch die *Muelleritortis cochleta, Tritortis kretaensis* und einer noch nicht benannten von Kozur & Mostler (1994, 1996b) vorgeschlagenen Zone.

Das Yaylakuzdere Profil wird hauptsächlich durch Ozeanbodenbasalte repräsentiert, die von pelagischen Kalken mit Schieferzwischenlagen an der Basis unterlagert werden, und kieselige Kalke am Top mit verschiedenen, z.T. gut erhaltenen pyritisierten höchstkarnischen bis frühnorischen Radiolarien. 3 Conodontenzonen sind innerhalb der pelagischen Kalke nachweisbar, nämlich *Epigondolella primitia* (spätestes Karn und frühestes Nor), *Epigondolella abneptis*- (frühes Nor) und *Epigondolella triangularis* Zone, den obersten Teil des frühen Nors repräsentierend. Hier wird auch die in den Conodontenzonen enthaltene Radiolarienfauna dargestellt, bzw. die Korrespondenz dieser beiden Faunen.

Das dritte Profil (Dikmetas Profil) der Antalya Decken wurde innerhalb der Cataltepe-Decke aufgemessen. Diese setzt sich aus einer Wechsellagerung von Sandsteinen und Schieferzwischenlagen mit biohermalen Kalken zusammen, die aus einer Wechsellagerung von pelagischen Kalken mit kieseligen Partien besteht und die eine relativ gut erhaltene rätische bis frühliassische Radiolarienfauna zeigt. Die Radiolarienfauna vom basalen Teil des Räts in diesem Profil entspricht den Assemblage Zonen 2b und 2c, die durch Carter (1993) aufgestellt wurde, während die Fauna des oberen Teiles vom Rät mit der Assemblage Zone 3 von Carter (1993) übereinstimmen dürfte. Der frühjurassische Teil des Dikmetas Profils wird vor allem durch *Parahsuum simplum* YAO und einer damit verbundenen Fauna, die sehr charakteristisch für diesen Zeitintervall ist, repräsentiert.

Das vierte profil, das Haciyunuslar Profil, von der Huglu Einheit der Beysehir-Hoyran Decke im Taurus Gebirge. Es ist hauptsächlich aus einer typischen Wechsellagerung von Tuffen, Tuffiten und basische Vulcanite mit kalken aufgebaut. Die ganze Folge wird überlagert von spättriassischen bis spätkretatischen pelagischen Sedimente. Eine gut erhaltene und stark diverse mittelkarnische Radiolarienfauna wurde aus den roten, dünnplattigen, pelagischen Kalken herausgelöst und untersucht. Die Radiolarienvergesellschaftung dieser kalke zeigt die Präsenz der *Tetraporobrachia haeckeli* Zone nach Kozur & Mostler (1994) auf.

Weiters wurde im Zusammenhang mit den 4 Profilen des Taurus Gebirges auch eine Radiolarienvergesellschaftung eines spätnorischen Gesteinsblockes, welcher selbst wieder aus einer Wechsellagerung von Kiesellagen und Tonsteinen innerhalb des Ankara Ophiolit Melange besteht, im Umfeld von Ankara untersucht. Es handelt sich hier um eine Radiolarienvergesellschaftung, die vor allem die *Betraccium deweveri* Subzone der *Betraccium* Zone nach Blome (1984) widerspiegelt.

In dieser Studie wurden 284 Arten und Unterarten, sowie 48 Taxa mit offener Nomenklatur untersucht. 70 Arten und 5 Unterarten wurden neu aufgestellt; diese Taxa gehören zu 115 genera (14 von diesen neu: *Dicapnuchosphaera, Monocapnuchosphaera, Nodocapnuchosphaera, Paricrioma, Braginastrum, Pseudogodia, Tauridastrum, Tricornicyrtium, Alatipicapora, Kozuricyrtium Praeprotunuma, Senelella, Mostlericyrtium, Papiliocampe*). Sie gehören 41 Familien an. Zum Abschluß wurde einer Liste der Taxa und ihre stratigraphische Reichweite erarbeitet.

1.INTRODUCTION

After 1970, many studies have been carried out on the radiolarian biostratigraphy by using the new extraction techniques. Especially middle and late Triassic radiolarian biostratigraphy were clarified by many researches as Kozur & Mostler (1972, 1978, 1979, 1981, 1983, 1990, 1994, 1996a, 1996b), Kozur & Krahl (1984), Kozur (1984a, 1984b, 1988a, 1988b, 1996), Kozur et al. (1996), Dumitrica (1978a, 1978b, 1982a, 1982b, 1991), Dumitrica et al. (1980), Donofrio & Mostler (1978), De Wever et al. (1979, 1990), De Wever (1982b, 1984b), Lahm (1984), Gorican & Kolar-Jurkovsek (1984), Gorican & Buser (1990), Halemic & Gorican (1995), Kolar-Jurkovesk (1989, 1990), Dosztaly (1989, 1993, 1994), Donofrio (1991), Mostler & Krainer (1994), Pessagno et al. (1979), Pessagno & Blome (1980), Blome (1983, 1984), Blome et al. (1987, 1989), Blome & Reed (1995), Carter (1990, 1991, 1993), Carter et al. (1989), Nakaseko & Nishimura (1979), Yao et al. (1980), Yao (1982), Yao et al. (1982), Matsuda & Isozaki (1982), Yoshida (1986), Sashida & Igo (1992), Sashida et al., (1993), Sugiyama (1992, 1997), Yeh (1989, 1990, 1992), Cheng (1989), Yeh & Cheng (1996), Bragin (1986, 1990, 1991a, 1991b, 1994), Bragin & Krylov (1996) and Bragin & Tekin (1995, 1996).

Although there are many Radiolaria bearing pelagic Triassic sediments in Turkey, very few detailed studies were realized on the Triassic radiolarian biostratigraphy from the Turkish material (De Wever et al., 1979; De Wever, 1982b; Bragin & Tekin, 1995, 1996).

This study is the main part of author's Ph. D. Thesis, which was submitted in University of Innsbruck. The main purpose of this study is to clarify the biostratigraphy and systematics of the ate middle and late Triassic Radiolarians from Taurus Mountains and Ankara region. Furthermore, general stratigraphy of the Antalya Nappes are evaluated and revised by means of the individual age determinations of Radiolarians from different parts of this nappe. As a result of intensive field studies between 1994-1998, five different localities have been selected for detailed radiolarian biostratigraphy and systematics from late Ladinian to Rhaetian. Three of the studied sections are located in the Antalya Nappes (the Sugozu Measured Section from the Alakircay Nappe with late Ladinian-early Carnian radiolarian fauna, the Yaylakuzdere Measured Section from the Alakircay Nappe with latest Carnian-early Norian radiolarian fauna and the Dikmetas Measured Section from the Cataltepe Nappe with Rhaetian to early Jurassic radiolarian fauna). One section measured at the Huglu Unit of Beysehir-Hoyran Nappe (the Haciyunuslar Measured Section) in the Taurus Mountains yielded moderately preserved but diverse middle Carnian radiolarian fauna. In addition to these four sections situated at the Taurus Mountains, the radiolarian assemblage of one sample derived from a late Norian block of the Ankara Ophiolitic Melange around Ankara region is also studied. Although some gaps are present within the sections (e. g. mainly late Carnian and middle Norian), the sections are more or less continuos.

2. GENERAL GEOLOGY

2. 1. Geological Outline of the Taurides

The Taurides, one of the major units of the Alpine-Himalian Orogenic belt, extend approximately 2000 km. parallel to Mediterranean sea coast at South Anatolia (Fig. 1). According to Ozgul (1983), it can be divided into 3 parts based on the geological and morphological characteristics. The segment from the Aegean coast to the Kirkkavak Fault is known as the "Western Taurides". The "Central Taurides" are located between the Kirkkavak and the Ecemis Fault. The segment to the east of the Ecemis Fault is named as the "Eastern Taurides" (Fig. 1). Based on this subdivision, the Sugozu, the Haciyunuslar and the Dikmetas Measured Sections are located in the Central

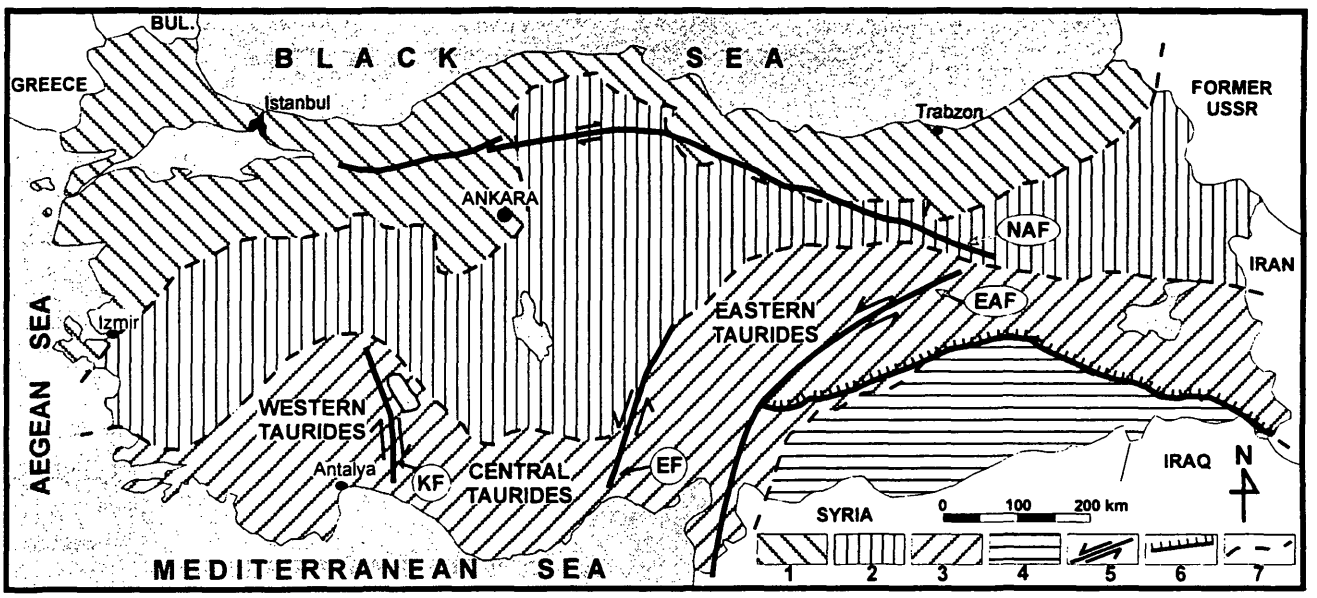


Figure 1. Major tectonic units of Turkey and geographical-subdivision of the Taurides (simplified after Ketin, 1966 and Ozgul, 1984a). 1. Pontides, 2. Anatolides, 3. Taurides, 4. Border Folds, 5. Strike-slip faults, 6. Overthrust, 7. Border of the tectonic units. EAF: East Anatolian Fault, NAF.: North Anatolian Fault, KF: Kirkkavak Fault, EF: Ecemis Fault.

Taurides whereas the Yaylakuzdere Measured Section is situated in the Western Taurides.

Detailed studies performed on the Tauride Belt have indicated that it consists of a number of allochthnous and autochthonous sequences with distinct stratigraphical, structural and metamorphic features (Fig. 2). Many authors (Blumenthal, 1947, 1951; Brunn et al., 1971, 1973; Monod, 1977; Gutnic et al., 1979 etc.) identified allochthnous units as nappes. However, Ozgul (1971, 1976, 1983, 1984a), Ozgul and Arpat (1973) have shown that the structural geology of the Taurides is further integrated by slicing of both allochthnous and autochthonous units with intervening paraautochthonous sequences. Ozgul (1984a) reconstructed these slices according to their original paleogeographic locations on the Mesozoic Tauride-Anatolide platform. This combination considers the Tauride-Anatolide Platform as a microcontinent surrounded by the Northern and Southern Neo-Tethyan Branches of Sengor and Yilmaz (1981) and Sengor et al. (1984) (Fig. 3).

In this study, the author will adopt the "nappe" nomenclature as the original descriptions of the stratigraphic sequences mainly have been established by the earlier group of researcher.

Brunn et al. (1971, 1973) defined three nappe systems, the "Beysehir-Hoyran-Hadim Nappes", the "Lycien Nappes" and the "Antalya Nappes" based on their emplacement age in the Central and Western Taurides. According to Ozgul (1971, 1976), however, Tauride Belt is composed of six main tectono-stratigraphic units as the "Geyikdagi Unit", the "Bolkardagi Unit", the "Aladag Unit", the "Bozkir Unit", the "Antalya Unit" and the "Alanya Unit". The Aladag Unit is equivalent of the Hadim Nappe; the Bozkir and Bolkardag units are synonyms of the Beysehir-Hoyran Nappes while the Antalya and the Alanya Units corresponds to the Antalya Nappes and Alanya Massive of Brunn et al. (1971, 1973).

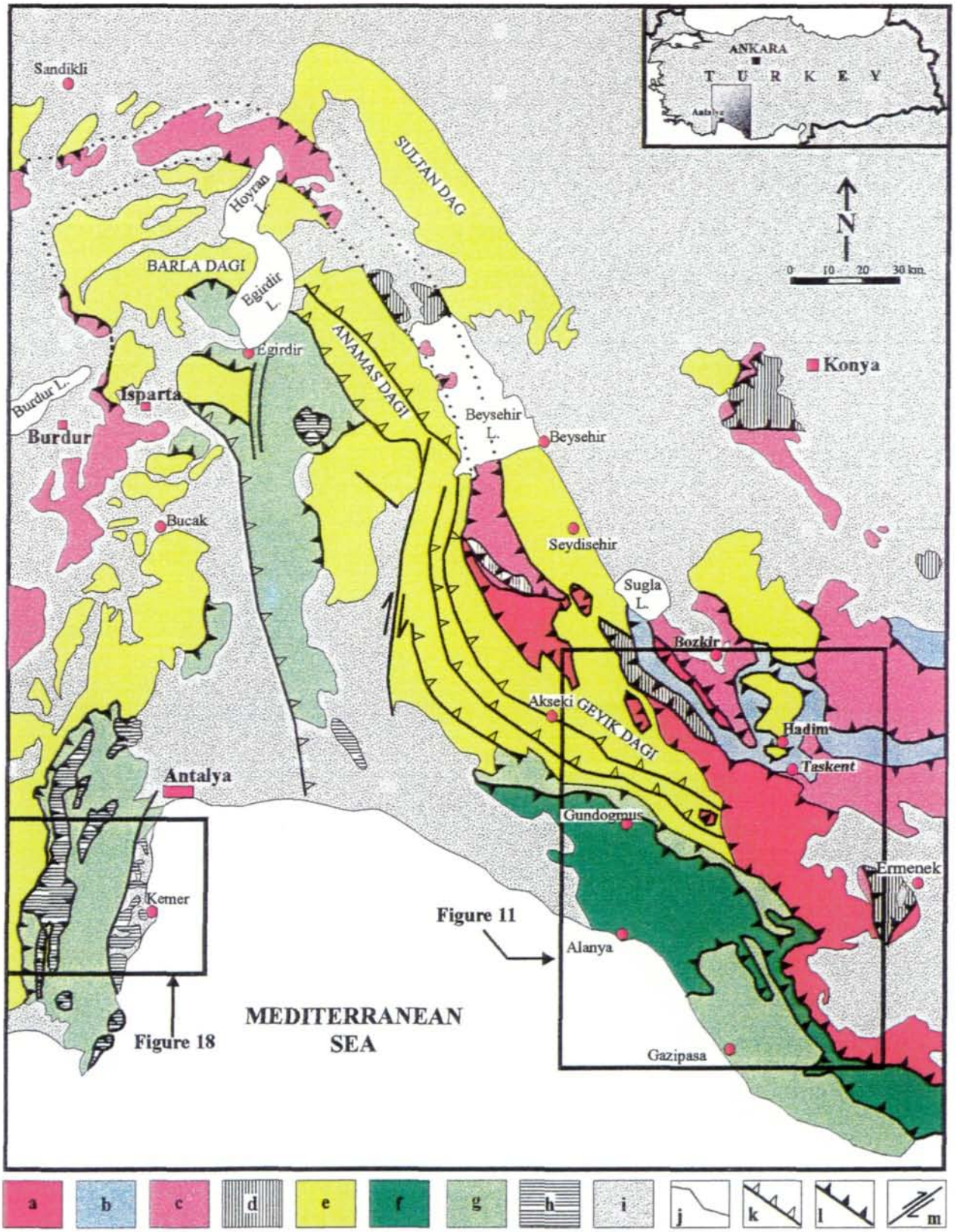


Figure 2. Schematic map showing the distribution of autochthonous and allochthonous sequences in the area between Western and Central Taurides (simplified and revised after Ozgul, 1984a). a. Hadim Nappe, b. Bolkardagi Nappe, c. Beysehir-Hoyran Nappe, d. Ophiolitic Nappes belonging to the Northern Branch of Neo-Tethys (Dipsizgol Ophiolite etc.), e. Beydaglari-Anamas-Akseki Autochthon, f. Alanya Nappe, g. Antalya Nappes, h. Ophiolitic Nappes belonging to the Southern Branch of Neo-Tethys (Tekirova Ophiolitic Nappes), i. Post-Eocene cover rocks, j. Normal contact, k. Thrust, l. Overthrust, m. Strike-slip fault.

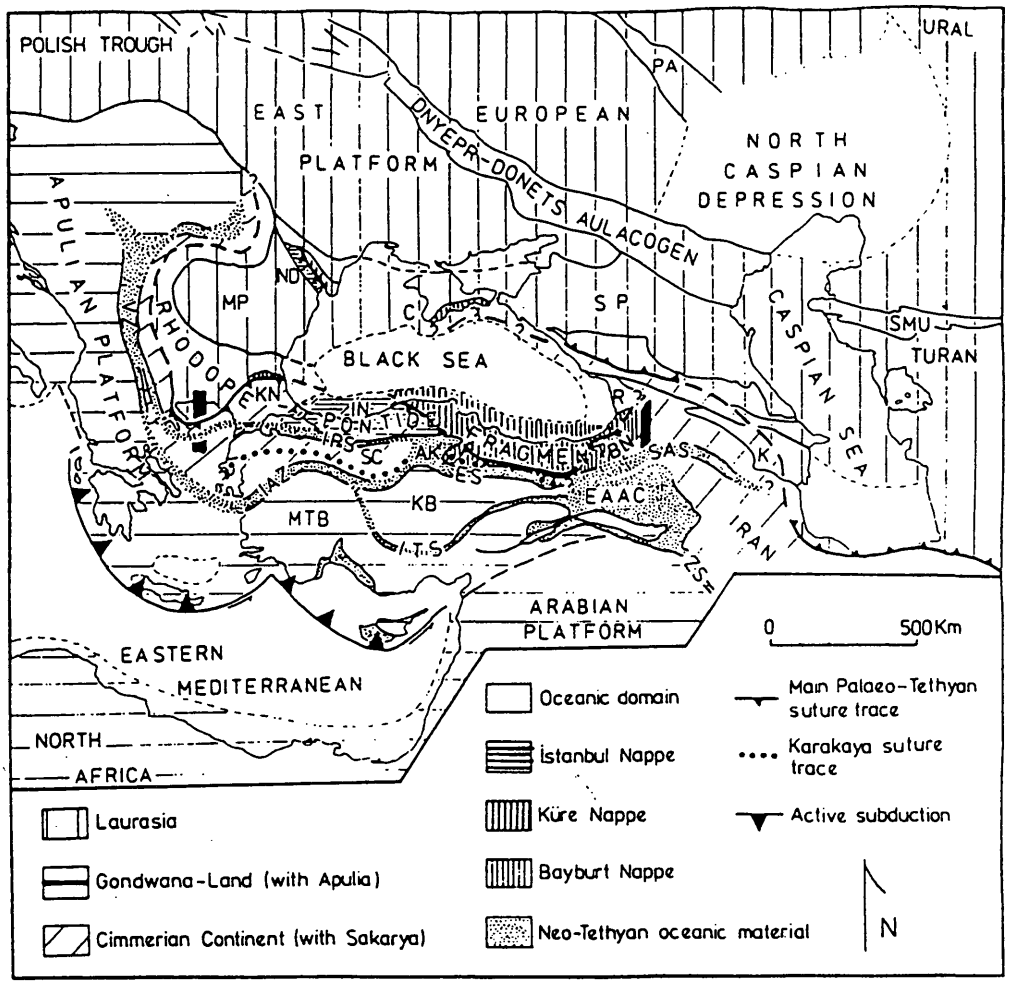


Figure 3. Semi-schematic tectonic map showing the Tethyan palaeotectonic elements in the Eastern Mediterranean area and surrounding regions. PA. Pachelma Aulacogen, SP. Scythian Platform, SMU. South-Mangyshlak/Ust Yurt uplift, C. Crimea, ND. North Dobrudja, MP. Moesian Platform, SC. Sakarya Continent, MTB. Menderes-Taurus Block, KB. Kirsehir Block, (MTB-KB. = Anatolide/Tauride platform), VZ. Vardar Zone, IPS. Intra-Pontide suture, IAZ. Izmir-Ankara Zone, AK. Ankara Knot, ES. Erzincan suture, SAS. Sevan-Akera suture, EAAC. East Anatolian accretionary complex, ZS. Zagros suture, KN., IN. and BN. are the Kirklareli, Istanbul and Bayburt nappes respectively. R. Riou, K. Khoura depressions. Two heavy, short, black, vertical lines depict the segment divisions of the Mediterranean Cimmerides (after Sengor et al., 1984).

The Beysehir-Hoyran-Hadim Nappes originated from the northern Branch of Neotethys could be subdivided into three nappe systems as the "Beysehir-Hoyran Nappe", the "Hadim Nappe" and the "Bolkardagi Nappe" in the Central Taurides. The Bolkardagi Nappe is situated at the north of the Central Taurides between the Central Anatolian metamorphic massifs (Anatolides) and Tauride Belt (Fig. 2). It comprises shelf type clastics and carbonates of Devonian-late Cretaceous age and shows a regional metamorphism in greenschist facies (Ozgul, 1976). The Hadim Nappe comprises the shelf type clastics and carbonates of late Devonian-late Cretaceous age and rests directly over the Anamas-Akseki Autochthon (Blumenthal, 1947; Ozgul, 1976). The detailed stratigraphy of the Beysehir-Hoyran Nappe will be explained in the following chapter as it is one of the main topics of this study.

The autochthonous sequence was named as the Geyikdagi Unit by Ozgul (1976) for whole the Tauride Belt. The name "Bey Daglari-Anamas-Akseki Autochthon" suggested by Senel et al.

(1992, 1996) will be adopted herein instead of the Geyikdagi Unit.

The Bey Daglari-Anamas-Akseki Autochthon lies beneath the allochthonous units (Fig. 2) and is subdivided into two parts; the Beydaglari Autochthon at the western part of the Antalya Gulf and the Anamas-Akseki Autochthon in the Central Taurids. The Anamas-Akseki Autochthon consists of platform type sediments that begins with early Paleozoic deposits (mainly Cambrian and Ordovician rocks) followed by transgressive Mesozoic-early Tertiary carbonates. The Beydaglari Autochthon succession is mainly composed of middle-late Triassic to Senonian platform type carbonates at the lower part, continues with Tertiary clastic sediments and culminates with early Miocene deposits (Poisson, 1977; Senel, 1997d).

Nappes originated from the Southern Branch of Neo-Tethys are the Alanya Nappe and the Antalya Nappes (Ozgul, 1976). A recent study (Ozturk et al., 1995) suggested that the Alanya Nappe is mainly composed of Cambrian-late Cretaceous platform and in places basinal sediments and could be the metamorphic equivalent of the Antalya Nappes. The detailed stratigraphy of the Antalya Nappe will be explained in the following chapter as it is one of the main topics of this study.

2. 1. 1. General Geological Features of the Studied Units in the Taurides

2. 1. 1. 1. The Beysehir-Hoyran Nappe

As a whole, the Beysehir-Hoyran Nappe resembles a huge "structural complex" including either blocks or slices of pelagic and neritic limestones, radiolarites, submarine volcanic rocks and tuffs deposited at late Triassic-late Cretaceous time span intercalated with oceanic assemblages such as diabase, ultramafics, serpentinite etc. (Ozgul, 1984a). This nappe was investigated and named by various authors in different regions; the "Schist-Radiolarite Formation" (Blumenthal, 1956) at Karaman (Konya) region, the "Western Lycien Nappes" (Graciansky, 1967) at Fethiye-Koycegiz region (Western Taurus), the "Beysehir-Hoyran Nappe" (Gutnic et al., 1968), the "Ophiolitic Serie" (Ozgul, 1971) at Hadim-Bozkir region and the "Bozkir Unit" (Ozgul & Arpat, 1973) at the Central Taurus. According to Brunn et al. (1971), the Beysehir-Hoyran Nappe could be subdivided into four units as the "Boyalitepe Unit", the "Huglu Unit", the "Gencek Unit" and the "Peridotite Unit" whereas Ozgul (1976) subdivided the Bozkir Unit as the "Boyalitepe Group", the "Huglu Group", the "Gencek Group" and the "Kayabasi Group". Later, Ozgul (1997) assumed that the Bozkir Unit is composed of four different groups as the "Boyalitepe Group", the "Huglu Group", the "Sogucak Limestone" and the "Korualan Group".

Gutnic & Monod (1970) suggested that the Boyalitepe Unit is mainly represented by thick Norian-Rhaetian carbonates at the base and condensed Liassic- late Cretaceous pelagic sediments (ammonitico Rosso facies at Liassic and pelagic limestones and radiolarite at Cretaceous) conformably overlie these lithologies.

Detailed stratigraphy of the Huglu Unit will be explained in the following chapter.

While Brunn et al. (1971) assumed that the Gencek Limestone is mainly composed of Triassic massive reefal limestone, Ozgul (1976) defined it as a continuos sequence of Permian to Jurassic limestones.

According to Brunn et al. (1971), the Peridotite Unit consists mainly of serpantinized harzburgites cut by numerous doleritic dykes.

2. 1. 1. 1. 1. The Huglu Unit

This unit is made up of tuff and basic volcanics with intercalations of Radiolaria bearing limestones and shales at the base and pelagic limestones with chert nodules and clastics including many blocks at the top (Ozgul, 1997). It was studied by Brunn et al (1971), Monod (1977) and Gutnic et al. (1979) at the west and southwest of Beysehir town; by Blumenthal (1956), Tuzcu (1972), Kocyigit (1977) and Gokdeniz (1981) between Ermenek town and Karaman city (north of Ermenek and southwest of Karaman) and by Ozgul (1997) around Bozkir-Hadim-Taskent towns (Figs. 2, 4 and 5).

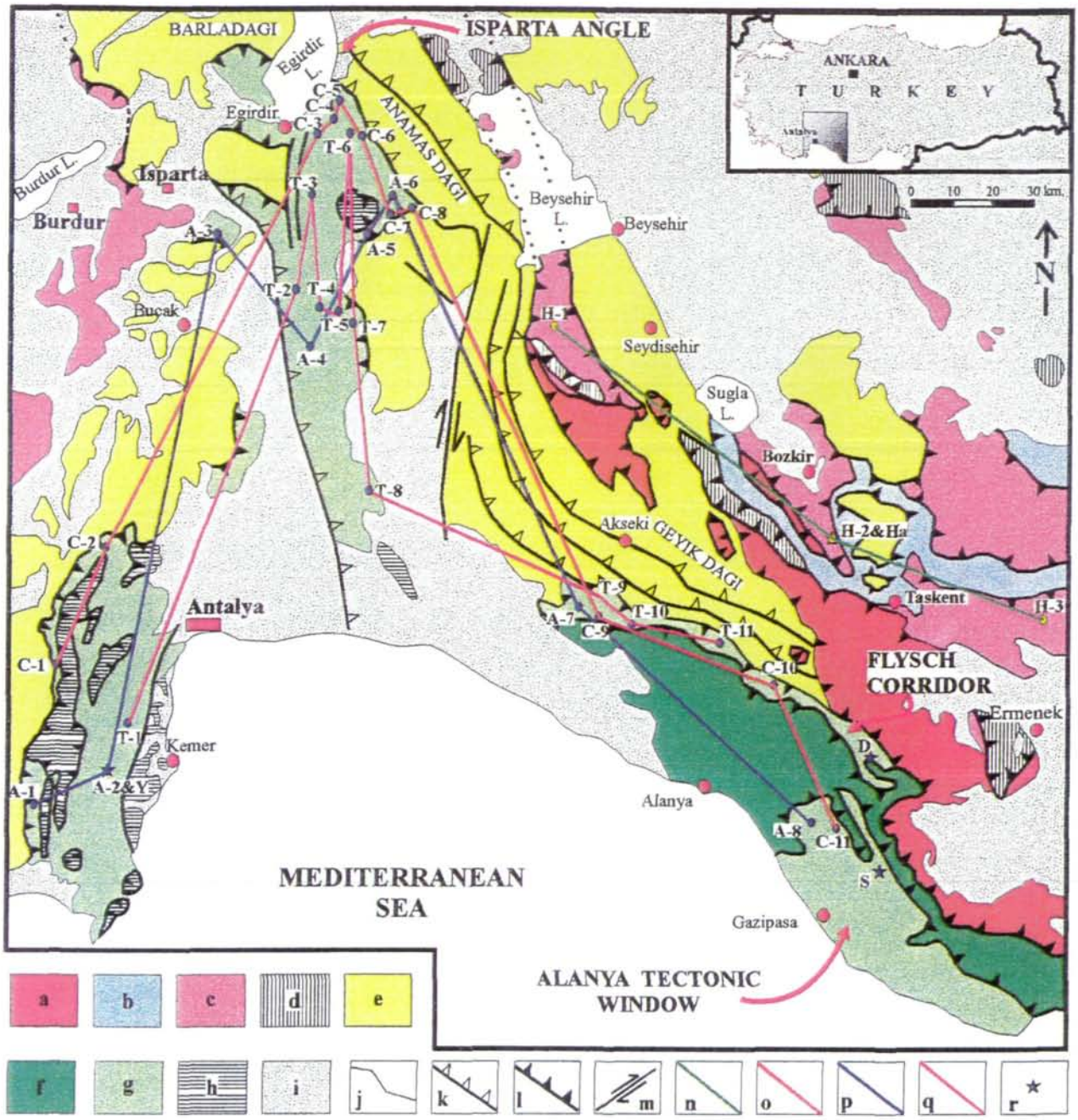


Figure 4. Schematic map showing the location of the sections in the area between Western and Central Taurides a. Hadim Nappe, b. Bolkardagi Nappe, c. Beysehir-Hoyran Nappe, d. Ophiolitic Nappes belonging to the Northern Branch of Neo-Tethys (Dipsizgol Ophiolite etc.), e. Beydaglari-Anamas-Akseki Autochthon, f. Alanya Nappe, g. Antalya Nappes, h. Ophiolitic Nappes belonging to the Southern Branch of Neo-Tethys (Tekirova Ophiolitic Nappes), i. Post-Eocene cover rocks, j. Normal contact, k. Thrust, l. Overthrust, m. Strike-slip fault, n. Correlation line of the sections at Huglu Unit; H-1: Huglu, H-2: Sogucak, H-3: Tozlubelenimevkii, o. Correlation line of the sections at Cataltepe Nappe; C-1: Derekoy, C-2: Cataltepe, C-3: Yilanli, C-4: Sofular, C-5: Seyhdere, C-6: Zindan, C-7: Kocaoluk, C-8: Yaka, C-9: Aygirdere, C-10: Kayabuku (Guzelsu), C-11: Inasar; p. Correlation line of the sections at Alakircay Nappe; A-1: Kumluca, A-2: Alakircay Synthetic, A-3: Ispartacay, A-4: Candir, A-5: Sulekler, A-6: Kocular, A-7: Hocakoy, A-8: Generalized Section of the Antalya Nappe; q: Correlation line of the sections at the Tahtalidag Nappe: T-1: Tahtalidag Synthetic, T-2: Dutdibi, T-3: Dulupdag, T-4: Gume, T-5: Yumaklar, T-6: Akpinar, T-7: Erenler, T-8: Ovacikdag, T-9: Katrandag, T-10: Kavzandag, T-11: Gundogmus, r: Locations of the measured sections in this study; Ha: Haciyunuslar; Y: Yaylakuzdere, S: Sugozu, D: Dikmetas.

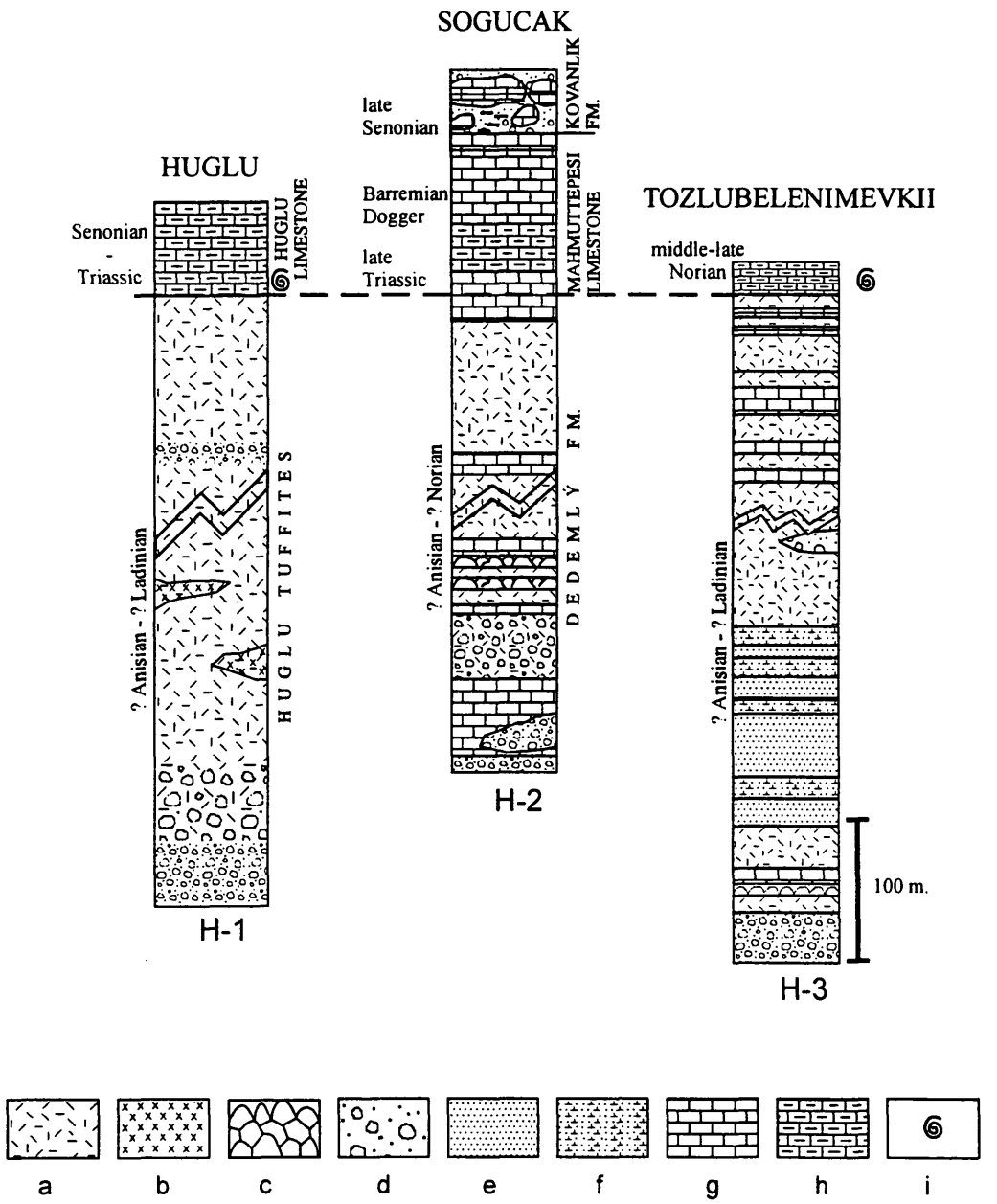


Figure 5. Correlation of the stratigraphic sections of the Huglu Unit from the previous studies,. H-1. Huglu Section (after Monod, 1977), H-2. Sogucak Section (after Ozgul, 1997), H-3. Tozlubelenimevkii Section (after Gokdeniz, 1981); Lithologies; a. Tuff-tuffite, b. Diabase, c. Spilitic lava, d. Breccia and pebbles, e. Sandstone, f. Silt-Marl, g. Limestone, h. Cherty limestone, i. Ammonite bearing levels.

According to Monod (1977), the Huglu Unit constitutes from bottom to top, "Huglu Tuffite" and "Huglu Limestone" at its type locality (Fig. 5). The equivalent of Huglu Tuffites is the "Dedemli Formation" in the Sogucak Section (Ozgul, 1997) and the "Bayirkoy-Ihsaniye Unit" in Tozlubelenimevkii Section at the south of Ermenek town (Gokdeniz, 1981; Figs. 4 and 5).

The Huglu Tuffites are made up of tuff, tuffite and basic volcanics and also include pelagic limestone, radiolarite and clastic intercalations. Huglu Tuffites comprise badly sorted limestone pebbles and blocks in a sand and clay matrix at its base. Its formation is related to a tectonic destabilization accompanied by volcanic activity (Ozgul, 1997; Fig. 5). At the base of the Huglu and the Tozlubelenimevkii Sections, clastic sediments dominate and the amount of tuffite gradually increases towards the upper part. Between the tuffites and clastic rocks close to the base of these sections, a spilitic lava sequence is mentioned in both Ozgul (1997) and Gokdeniz (1981). Monod (1977), as well, indicates the presence of diabase dyke at the middle part of the section (Fig. 5).

Monod (1977) obtained an Anisian age from the limestone blocks in volcanic breccia in the Huglu Tuffites at the type locality based on the following fauna: ? *Involutina* sp., ?*Trocholina* sp., *Glomospira* sp., *Hemigordius* sp., *Turitella mesotriassica* KOEHN-ZANNINETTI, *Opthalmidium* sp. Similarly, Gokdeniz (1981) reported a late Anisian-early Ladinian age from the limestone breccia in tuffite at the Tozlubelenimevkii Section located at the south of Ermenek town. The fauna of this limestone is as follows; *Agathammina iranica* ZANNINETTI, BRONNIMAN, BOZORGNIA et HUBER., *Endothyranella* cf. *wirzi* (KOEHN-ZANNINETTI), *Galeanella* sp., *Variostoma* sp., *Trochammina* sp., *Opthalmidium* sp. Since both determinations are from exotic shallow limestone blocks and were originated and transported from older formations due to tectonic destabilization, the age of the Huglu Tuffites should be younger than late Anisian-early Ladinian.

In this study, a middle Carnian age is assigned from moderately preserved, highly diverse radiolarian fauna obtained from the pelagic limestone intercalations in the tuffite beds. Although towards the upper part of the section, no radiolarian fauna could survive due to high calcification, the middle Carnian age is confirmed by conodont data. The radiolarian biostratigraphy of the Huglu Tuffites from the Haciyunuslar Measured Section will be explained in the following chapters.

The Huglu Tuffites are conformably overlain by the Huglu Limestone. This unit is composed of pelagic limestones with chert intercalations. It is called as "Mahmuttepesi Limestone" in the Sogucak Section (Ozgul, 1997). At the base of this unit, these limestones contain ammonite fauna. According to Gokdeniz (1981), based on a study at the south of Ermenek, a middle- late Norian age is assigned to these limestones due to the following ammonite fauna; *Placites* cf. *oxyphyllus* (MOJS), *Cladiscites* sp. At the top of this unit, planktonic foraminifers indicate the Coniacian-Santonian age (Ozgul, 1997). Therefore, the deposition age of the Huglu Limestone is middle Norian-Santonian.

According to Ozgul (1997), topmost part of the Huglu Unit is the Kovanlik Formation. This formation is not visible at the type locality (Monod, 1977) and the Tozlubelenimevkii Section (Gokdeniz, 1981). It is represented by a wild flysch with blocks of cherts, pelagic limestones, neritic limestones, dolomites and spilitic volcanics etc. and is late Senonian in age (Ozgul, 1997; Fig. 5).

2. 1. 1. 2. The Antalya Nappes

The Antalya Nappes are widely exposed at the southern part of the Central Taurides (Fig. 2). Geographically, this nappe system crops out widely at the central and western Taurus and could be separated in four different parts: west of the Antalya Gulf, "Isparta Angle" (Blumenthal, 1963), the "Flysch Corridor" (Blumenthal, 1951) and the "Alanya Tectonic Window" (Ozgul, 1983) around Gazipasa town (Fig. 4).

Many studies have been carried out at the western part of the Antalya Gulf. The first studies were realized by Altinli (1944), Holzer (1955), Colin (1955, 1962) and Blumenthal

(1963). Later, studies such as Lefevre (1967), Marcoux (1970, 1974, 1976, 1977, 1979), Marcoux & Baud (1986), Kalafatcioglu (1974), Poisson (1977), Woodcock & Robertson (1977, 1982), Gutnic et al. (1979), Robertson & Woodcock (1980, 1981a, 1981b, 1981c, 1982), Yilmaz (1978, 1981, 1984 a, 1984 b), Yilmaz et al. (1981), Senel (1980, 1984, 1986a, 1986b, 1997a, 1997b, 1997c) and Senel et al. (1981) have carried out in this area to clarify the stratigraphy and tectonics of the region.

The Antalya Nappes located at the Isparta Angle have been studied by Blumenthal (1947, 1951), Allasinaz et al. (1974), Dumont & Kerey (1975), Dumont (1976a, 1976b), Monod (1976, 1978), Akbulut (1977, 1980), Poisson (1977), Gutnic et al. (1979), Dumont et al. (1980), Waldron (1982, 1984), Yalcinkaya et al. (1986) and Senel et al. (1992, 1996).

Researches carried out at the Flysch Corridor are as follows; Blumenthal (1951), Erk (1968), Turkunal (1969), Ozyardimci (1973), Monod (1977,1978), Demirtasli (1987), Ozturk et al. (1991) and Senel et al. (1992). The Alanya Tectonic Window has been investigated by Blumenthal (1951), Dalkilic (1982), Ozgul (1983, 1984b) and Ulu (1983, 1989).

As the ophiolitic rocks are well preserved and exposed at the west of the Antalya Gulf and in the Isparta Angle, many studies such as: Juteau (1968, 1970, 1975, 1979), Juteau & Marcoux (1973), Juteau & Whitechurch (1980), Juteau et al. (1973, 1977), Reuber (1982, 1984), Reuber et al. (1983) and Whitechuch et al. (1984) have been carried out in this area.

The regional setting of the Antalya Nappes and their tectonic evolution has been discussed by Brunn et al. (1970, 1971), Delaune-Mayere et al. (1977), Dumont et al. (1972), Ricou et al. (1974, 1975, 1979), Ricou (1980), Ozgul (1976, 1984a), Ozgul & Arpat (1973), Poisson et al. (1984), Senel (1984) and Robertson (1993).

The nappe system was first recognized by Altinli (1944) but was described and named by Lefevre (1967) at the west of the Antalya Gulf. The single nappe were first subdivided by Brunn et al (1971) as the "Cataltepe Unit", the "Alakircay Unit" and the "Tahtalidag Unit" according to their stratigraphic features. Then, it was named by Ozgul (1976) as the "Antalya Unit" and by Woodcock & Robertson (1977) as the "Antalya Complex". Many authors have also subdivided it into many formations and structural units. Finally, Senel et al. (1992) renamed and described them as the "Cataltepe Nappe", the "Alakircay Nappe", the "Tahtalidag Nappe" and the "Tekirova Ophiolitic Nappes" based on their stratigraphical and lithological properties.

Detailed stratigraphy and the individual age determinations from the Cataltepe, the Alakircay and the Tahtalidag Nappes will be explained in the further chapters.

According to Senel et al (1992), the Tekirova Ophiolite Nappes could be subdivided into the "Tekirova Ophiolite" and the "Kirkdirek Formation". According Juteau (1975) and Reuber (1982), the Tekirova Ophiolite is mainly composed of serpentinized peridotite, pyroxenite, gabbros, plagiogranites, diabase dyke complex and isolated dykes. At its base, the ophiolite contains a tectonized zone with serpentinite, marbles, limestones and chert blocks (Senel et al, 1992; 1996). The Kirkdirek Formation has the characteristic features of an ophiolitic melange. It contains blocks of Halobia limestones, sandstones with plant remains, shales, bedded cherts, basic volcanics, neritic limestones, gabbro, diabase, amphibolite etc. in a serpentinite matrix. The formation age is assumed to be late Senonian and ascribed to the obduction of the Ophiolite Nappe over the carbonate platform (Senel et al., 1996; Senel, 1997b).

2. 1. 1. 2. 1. The Cataltepe Nappe

This nappe is structurally the lowermost unit of the Antalya Nappes and coincide with the "Lower Nappe (Cataltepe Unit)" of Brunn et al. (1971) and the "Kumluca zone" (northern part) of Robertson & Woodcock (1981a). The main characteristic of this nappe is having a late Triassic shelf and Jurassic-Cretaceous slope and basinal deposits (Senel et al., 1996).

In this study, eleven stratigraphical sections from the Cataltepe Nappe have been selected to give general stratigraphical aspects of this nappe

system (Figs. 4 and 6). These are, from west to east, the Derekoy and the Cataltepe Sections from the west of the Antalya Gulf, the Yilanli, the Sofular, the Seyhdere, the Zindan, the Kocaoluk and the Yaka Sections from the Isparta Angle, the Aygirdere and the Kayabuku (Guzelsu) Sections from the Flysch Corridor and Inasar Section from the Alanya Tectonic Window.

In most of the tectonic slivers of the Cataltepe Nappe in Southern Turkey, the lower part is represented by the Kasimlar Formation of Norian age (Senel et al., 1992). It is composed of plant remain bearing sandstones, siltstones and claystones with intercalations of brecciated limestones and sandy-clayey limestones. The same unit is named as the Tilkideligitepe Formation in the Cataltepe and Derekoy Sections (Poisson, 1977). Lithologies and names of the overlying rock units vary from one section to the other (Fig. 6).

The chert-mudstone dominated unit is known as the Derekoy radiolarite and occurs in the Derekoy and the Kocaoluk Sections. At its type locality (the Derekoy Section), continous deposition from Rhaetian to Senonian without any break has been suggested by Marcoux (1979). Base of the Kocaoluk Section is not visible because of intense folding and tectonic truncation (Fig. 6). In the middle part of the section, a late Albian-Turonian age is assigned based on the following fauna;

95-UKT-60;*Pseudodictyomitra pseudomacrocephala* (SQUINABOL), *Mesosaturnalis horridus* (SQUINABOL), *Halesium quadratum* PESSAGNO, *Godia* sp., *Archaeospongoprunum* sp.

From the top of Derekoy Section, an additional Campanian age is assigned due to very rich radiolarian fauna including;

95-UKT-56; *Dictyomitra duodecimcostata* (SQUINABOL), *Xitus* ex. gr. *asymbatos* (FOREMAN), *Dictyomitra koslovae* FOREMAN, *Dictyomitra formosa* SQUINABOL, *Crucella messinae* (PESSAGNO), *Crucella robusta* BRAGINA, *Patelulla planoconvexa* PESSAGNO, *Pseudoaulophacus parguerаensis* PESSAGNO.

The Yenicebogazidere Formation of Rhaetian?-Liassic-Coniacian age conformably overlies the Tilkideligitepe Formation where limestone dominate at the lower part of the section, following upward by an alternation of calciturbidites, cherts and shales in the Cataltepe Section (Poisson, 1977; Fig. 6). The same formation is located in the Yilanli Section. A middle Oxfordian- Berriasian Radiolarian fauna have been recovered from two chert levels in the middle part of the Yenicebogazidere Formation in the Yilanli Section as follows;

95-UKT-87 *Mirifusus dianae* (KARRER), *Mirifusus chenodes* (RENZ), *Spongocapsula perampla* (RUST), *Ristola* sp., *Podobursa* sp., *Xitus* sp.

Another sample from the upper part of the succession yielded the following fauna;

95-UKT-88; *Pseudodictyomitra carpatica* (LOZYNAK), *Holocryptocanium barbui* DUMITRICA, *Thanarla* sp. cf. *T. conica* (ALIEV), *Parvicingula cosmoconica* (FOREMAN), *Praeconocaryomma* sp., *Archaodictyomitra* sp. (Barramian-Aptian).

At both of these sections, the Yenicebogazidere Formation is unconformably overlain by the Kecili Formation of late Campanian-Maastrichtian age.

The Devret Formation of Rhaetian-Dogger age is mainly represented by calciturbidites and locally alternates with sandstones including plant remains, sandy-clayey limestone and cherty limestone. It is unconformably overlain by the Cevlim Formation of late Senonian age in the Seyhdere and the Sofular Sections (Senel et al, 1992; 1996). The Cevlim Formation is made up of calciturbudites, micritic limestones, cherts etc. These facies show vertical and lateral transitions to each other (Fig. 6).

Three different units (the Karacam Formation, the Zindan radiolarite and the Gavurcali Formation) are reported in the Zindan Section (Senel et al., 1992, 1996). The Karacam Formation of Rhaetian-Dogger-Malm? age is completely composed of calciturbidite. It is conformably overlain by the Zindan Radiolarite of Malm age. It is composed of an alternation of

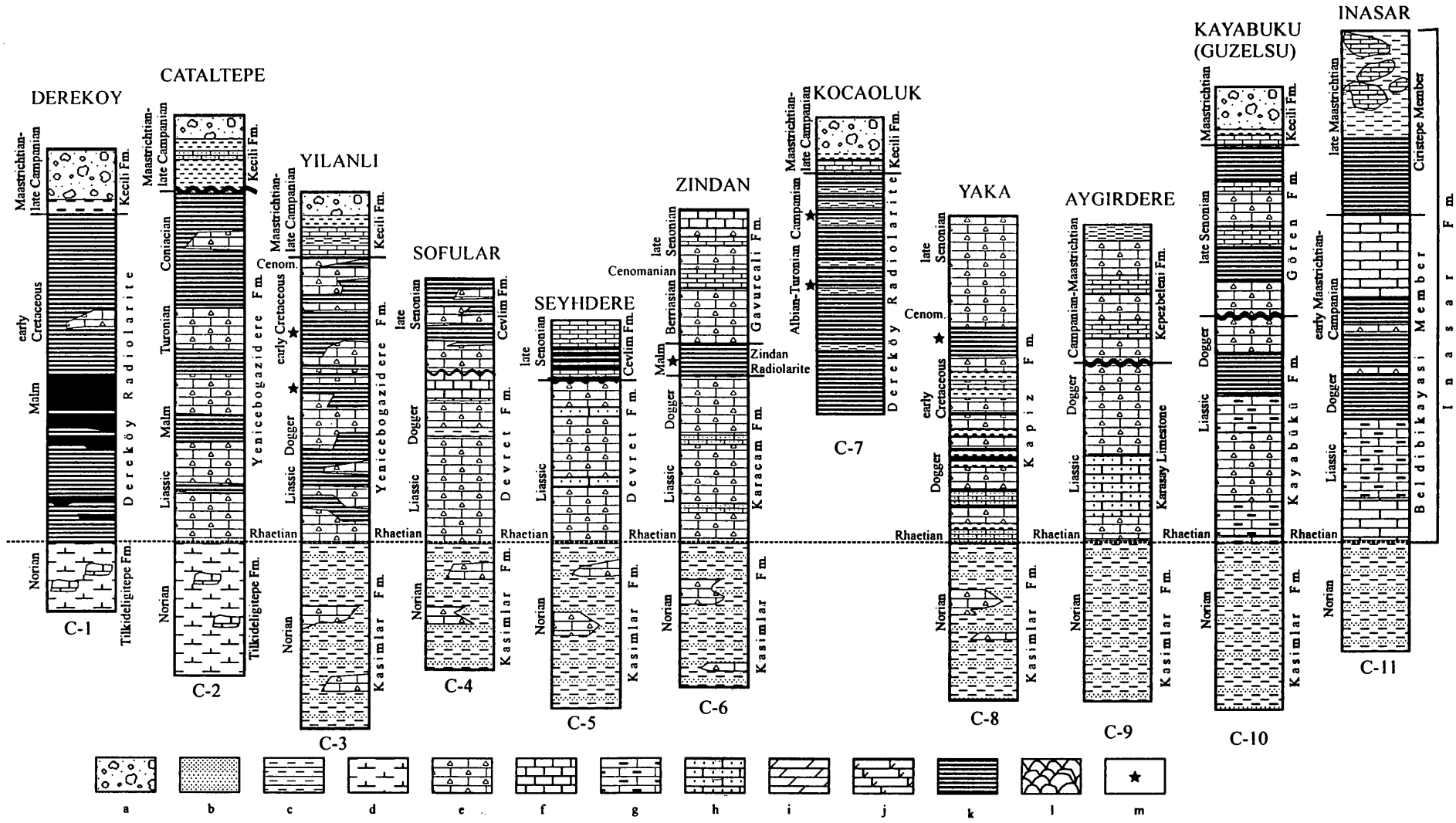


Figure 6. Generalized columnar sections from Cataltepe Nappe of the Antalya Nappes: C-1. Derekoy Section (revised after Marcoux, 1979 and after Senel, 1997b), C-2. Cataltepe Section (revised after Poisson, 1977 and after Senel, 1997b), C-3. Yilanli Section, C-4. Sofular Section, C-5. Seyhdere Section (after Senel et al., 1996), C-6. Zindan Section (revised after Dumont et al., 1980 and after Senel et al., 1996), C-7. Kocaoluk Section, C-8. Yaka Section (after Senel et al., 1996), C-9. Aygirdere Section (after Senel et al., 1992), C-10. Kayabuku (Guzelsu) Section (revised after Monod, 1977 and after Senel et al., 1992), C-11. Inasar Section (revised after Ozgul, 1983), Lithologies: a. Breccia and conglomerate, b. Sandstone, c. Shale, d. Marl, e. Calciturbidite, f. Limestone, g. Cherty limestone, h. Sandy limestone, i. Dolomite, j. Dolomitic limestone, k. Chert and mudstone alternation, l. Spilitic lava-volcanics, m. Location of the individual age determinations.Datum level is base of Rhaetian (Not to scale).

cherts and mudstones, was studied in detail, and named by Dumont et al. (1980). Oxfordian?-Kimmeridgian-Tithonian age is assigned from one of the chert sample due to following fauna;

95-UKT-177; *Triactoma* sp. cf. *T. jonesi* PESAGNO, *Saldorfus corralitoensis* PESSAGNO, *Mirifusus* sp. cf. *M. dianae* (KARRER), *Mirifusus* sp., *Palinandromeda* sp., *Homoeparonaella* sp.

The Gavurcali Formation of Berriasian- late Senonian age conformably overlies the Zindan radiolarite. This formation mainly consists of calciturbidites and micritic limestones with some chert nodules. Because of intense tectonic slicing, the upper part of the sections is not visible (Senel et al., 1996).

The Kapiz Formation of Rhaetian-late Senonian age is only observed in the Yaka Section. It is represented by an alternation of claystones, sandstones, sandy-clayey limestones, brecciated limestones, calciturbidites, micritic limestones and cherts at the bottom. Late Vallangian-Albian age is assigned from the chert sample due to following fauna;

95-UKT-63; *Crolanium pythiae* SCHAAF, *Crucella bossoensis* JUD.

It is characterized by brecciated limestones with local chert nodules and bands at the upper part of the section.

The Aygirdere and the Kayabuku (Guzelsu) Sections are located at the Flysch Corridor. The Rhaetian-Maastrichtian part of the Aygirdere Section could be subdivided into two units. The Rhaetian-Dogger Karasay Limestone contains brecciated limestones with thin shale intercalations, conglomeratic limestones at the base and brecciated limestones, sandy limestones and conglomeratic limestones at the top. It is unconformably overlain by the Kepezbeleni Formation of Campanian-Maastrichtian age, which is represented by brecciated limestones and micritic limestones (Fig. 6).

Three formations could be separated at the Rhaetian-Maastrichtian part of the Kayabuku (Guzelsu) Section. The Kayabuku Formation of Rhaetian-Dogger age is represented by limestone with chert nodules at its base. It gradually passes upward into brecciated limestones and calciturbidites. Towards the upper part, limestones with chert nodules and bands are also present, the formation culminates with an alternation of cherts, shales, cherty limestones and brecciated limestones. Around Dikmetas Village (30 km. SE of the Kayabuku (Guzelsu) Section), chert nodules and bands in the limestones yielded moderately preserved Rhaetian radiolarian fauna together with conodonts while Liassic Radiolarians are obtained from overlying chert beds in the Dikmetas Measured Section (Figs. 4 and 6). The biostratigraphy and detailed lithological properties of this section will be explained in the further chapters. The Goren Formation of late Senonian age unconformably overlies the Kayabuku Formation, which is represented by brecciated limestones, cherty limestones and cherts. This formation is also unconformably overlain by the Kecili Formation (Fig. 6).

One of the section (the Inasar Section) chosen from the Alanya Tectonic Window was described by Ozgul (1983). The Rhaetian-Maastrichtian part of the section was named as the Inasar Formation which was subdivided into two members by the author. Beldibikayasi Member of Rhaetian-Campanian-early Maastrichtian age is represented by limestones - cherty limestones (at the base), an alternation of calciturbidites and cherts (at the middle part) and pelagic limestones (at the top). The Ciristepe Member overlies the Beldibikayasi Member and it contains an alternation of cherts and shales at the base and shales with many olistolithes at the top (Ozgul, 1983).

The Kecili Formation of late Campanian-Maastrichtian age crops out both in the Derekoy, the Cataltepe, the Yilanli and the Guzelsu Sections (Fig. 6). The main characteristic feature of this formation is its bearing of numerous blocks in a flyschoidal matrix (Senel et al., 1996).

2. 1. 1. 2. 2. The Alakircay Nappe

This unit is differentiated from the other nappes by mainly having middle-late Triassic pelagic sediments accompanied by basic volcanics (rift

deposits) and Jurassic-Cretaceous pelagic sediments (Senel et al., 1992, 1996). Its synonyms are as follows; the "Alakircay Unit " (Brunn et al., 1971), the "Ispartacay Formation" (Poisson, 1977), the "Guzelsu Unit" Monod (1977), the "Godene Zone" Woodcock & Robertson (1977), the "Candir Formation" (Akbulut, 1977), the "Alakircay Melange" (Yilmaz, 1978) and (Yilmaz & Maxwell, 1982), the "Alakircay Group" (Senel et al., 1981). Although, Brunn et al (1971) and Marcoux (1977, 1979) have postulated that the Alakircay Nappe and the ophiolites comprises the "Middle Nappe", further investigations (Robertson & Woodcock, 1980, 1982; Senel et al., 1981; Senel, 1986b; Yilmaz et al., 1981; Yilmaz, 1981) have shown that these two units should be evaluated as separate nappe systems.

Eight different sections have been selected from different parts of the Antalya Nappes as the Kumluca and the Alakircay-1 Synthetic Section from the west of the Antalya Gulf; the Ispartacay, the Candir Synthetic Section, the Kocular and the Sulekler Sections from the Isparta Angle, Hocakoy Section from the Flysch Corridor and the Generalised Columnar Section of the Antalya Nappes (GSAN) from the Alanya Tectonic Window (Figs. 4 and 7).

The Kumluca, the Ispartacay, the Sulekler and the Hocakoy Sections have similar features and will be evaluated together. These sections start with an alternation of late Triassic sandstones and shales (the Candir Formation and its equivalents) and cherty limestones (the Gokdere Formation). The Kumluca Section additionally contains an alternation of cherts and shales (the late Ladinian Tesbihli Formation) at the base. In these four sections, the Candir Formation and its equivalents gradually pass to the Gokdere Formation and its age is mainly Norian. In some cases, it covers partly or completely Rhaetian (Fig. 7).

These three formations display great variability in age and stratigraphic position in different nappe systems (e. g. the Tahtalidag Nappe). General characteristics of these formations can be summarized as follows;

The Tesbihli Formation is made up of an alternation of cherts and shales. These lithologies contain Dounella and Halobia. It has a complex relation with the Gokdere, the Candir and the Karadere formations. Although the age suggested by Senel (1997b) for this formation is late Ladinian, the equivalent of this formation (the Tirlar Member of Sapadere Formation) in the Alanya Tectonic Window indicate that the deposition of this formation should extend until early Carnian.

The Candir Formation is mainly composed of sandstones, shales and claystones. Locally, basic volcanics, conglomerates, limestones, sandy-clayey limestone lenses are also visible in minor amount. In many places, it shows vertical and lateral transitions to other formations (the Gokdere, the Tesbihli and the Karadere Formations) and its age varies from late Anisian to Norian in a regional scale (Senel, 1997b).

The Gokdere Formation comprises thin limestone and cherty limestone (Kalafatcioglu, 1973). In many places, it shows vertical and lateral transition to other formations (the Candir, the Tesbihli and the Karadere Formations). Its age varies from late Anisian to late Norian partly Rhaetian in different places due to its position (Senel, 1997b). De Wever et al. (1979), De Wever (1982) described Norian radiolarian fauna from three samples (T5-1, T5-6 and T5-7) from the equivalents of this formation in the Ispartacay Section. The fossil assemblages and age of these samples are as follows;

T5-1: Actinommid. group A, *Conosphaera fleuryi* DE WEVER, *Capnodoce anapates* DE WEVER, *Capnuchosphaera theolides* DE WEVER, *C. triassica* DE WEVER (early Norian);

T5-6; Actinommid.group A, *Conosphaera fleuryi* DE WEVER, *Spongosaturnalis triasicus* KOZUR & MOSTLER, *S.* sp. cf. *S. elegans* KOZUR & MOSTLER, *Capnodoce serisa* DE WEVER, *Capnuchosphaera triassica var* $\propto$ DE WEVER, *Icrioma tetrancistrum* DE WEVER, *Icrioma* sp. A, *Tripocyclia* ? sp. B,. *Tripocyclia* ? sp. C. (early Norian);

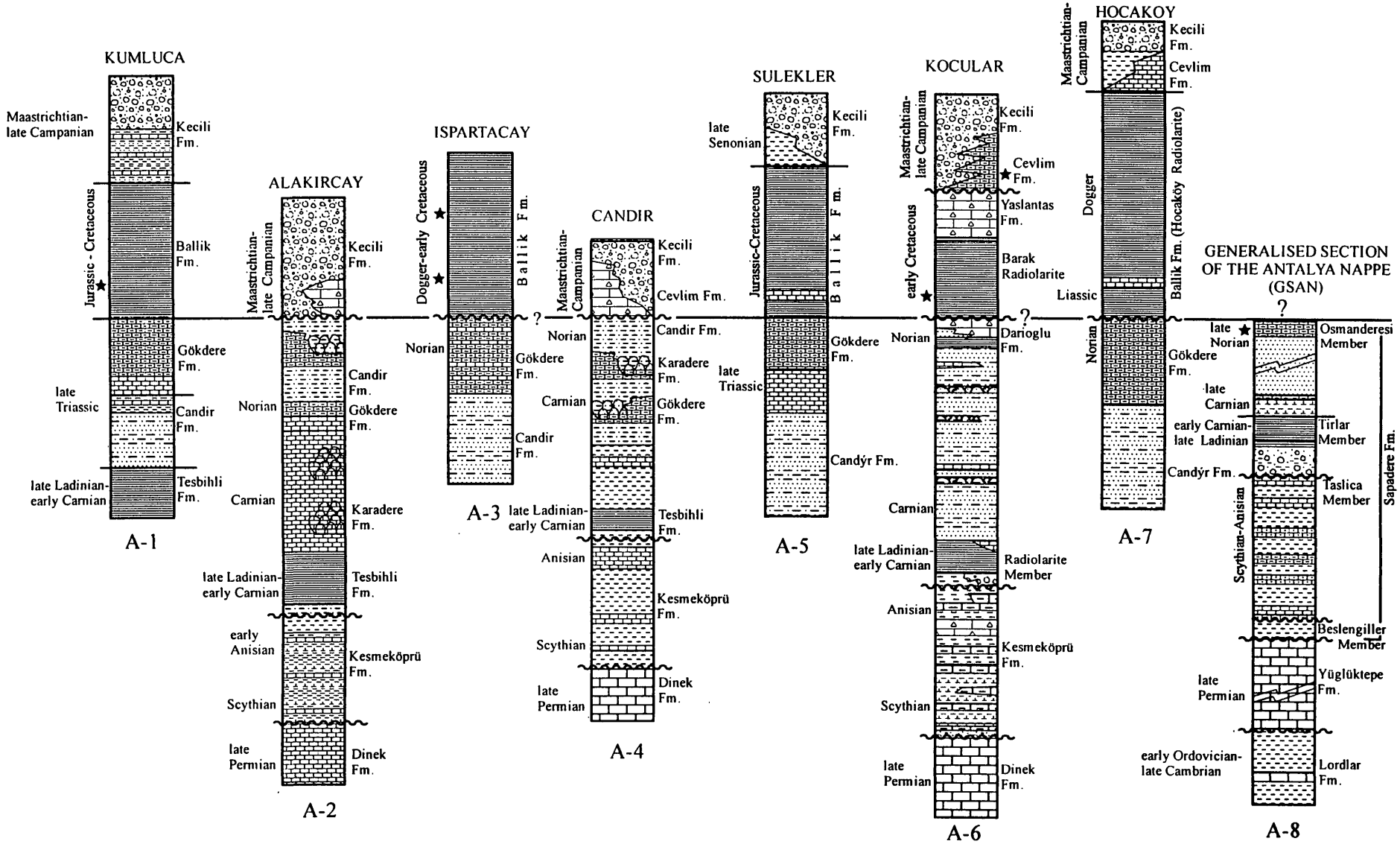


Figure 7. Generalized columnar sections from the Alakirçay Nappe of the Antalya Nappes. A-1. Kumluca Synthetic Section (after Senel, 1986a, b; 1997a), A-2. Alakircay Synthetic Section (revised after Senel, 1997a), A-3. Ispartacay Section (revised after Robertson, 1993), A-4. Candir Section, A-5, Sulekler Section, A-6. Kocular Section (revised after Senel et al., 1996), A-7. Hocakoy Section (revised after Senel et al., 1992), A-8. Generalised Section of the Antalya Nappe (revised after Ozgul, 1983). Datum level is base of Jurassic. For lithologies see Figure 6 (Not to scale).

T5-7; Actinommid.group A, *Capnodoce serisa* DE WEVER, *Capnuchosphaera triassica* DE WEVER, *C. triassica var* $\propto$ DE WEVER, *C. tricornis* DE WEVER, *Tripocyclia ? hedrecana* DE WEVER (middle Norian). Associated conodonts and Halobia fauna are also confirmed the age of the samples (De Wever et al., 1979).

In these four sections mentioned above, the Gokdere Formation is conformably or unconformably overlain by an alternation of thick Jurassic-Cretaceous cherts and shales and terminates with the late Campanian-Maastrichtian Kecili Formation. In the Kumluca Synthetic Section, an alternation of thick cherts and shales was named as the Ballik Formation by Robertson & Woodcock (1981 b). One of the samples (**96 UKT-197**) taken from the lower part of the Ballik Formation indicate an early Bajocian-early Callovian- ? early Oxfordian (UAZ 3-7-8?; Interrad, 1994) age based on the following fauna;

Eucyrtidiellium unumaense s.l. (YAO), *Mirifusus* sp. cf. *M. fragilis* s.l. BAUMGARTNER, *Protunuma* sp., *Palinandromeda* sp. aff. *P. praepodbielensis* (BAUMGARTNER), *Hsuum* sp., *Linaresia* sp., *Ristola* spp.

Although, the Ispartacay Section was defined as Carnian?-Norian in age by Allasinaz et al. (1974), recent studies (Robertson, 1993) reveal a Jurassic-Cretaceous age. Pessagno (in Robertson, 1993) described three different samples from the Ispartacay Formation with the following fossil assemblages and ages;

T/83/2; *Mirifusus* sp. aff. *M. guadalupensis* PESSAGNO (Kimmeridgian-early Hauterivian)

T/83/19; *Mirifusus* ? sp., *Archaeodictyomitra* sp., *Ristola* sp., *Archaeospongoprunum* sp., *Tripocyclia* sp. (Aalenian- early Hauterivian)

T/83/28; *Hsuum maxwelli* PESSAGNO, *Eucyrtidiellum ptyctum* (RIEDEL & SANFLIPPO), *Mirifusus* sp., *Angulobrachia* sp. (Kimmeridgian- early Tithonian)

In this study, two samples taken from the alternation of cherts and shales from the Ballik Formation in the Ispartacay Section (Figs. 4 and 7) yielded following fauna;

95-UKT-109; *Bernoullius rectispinus* s.l. KITO et al, *B.* sp, *Paronaella mulleri* PESSAGNO, *Parvicingula dhimenaensis* s.l. BAUMGARTNER, *Mirifusus guadalupensis* PESSAGNO, *Lineresia beniderkoulensis* EL KADIRI, *Hsuum* sp., *Ristola* sp., *Protonuma* sp. (middle Bathonian- late Oxfordian; UAZ 6-9; Interrad, 1994)

95-UKT-125; *Mirifusus dianae* s.l. (KARRER), *Thanarla pulchra* (SQUINABOL), *T. elegantissima* (CITA), *Archeodictyomitra* ? *lacrimula* (FOREMAN), *A.* sp., *Pseudodictyomitra carpatica* (LOZYNIAK), *Xitus spicularius* (ALIEV), *Stichocapsa* sp. (late Vallanginian-late Hauterivian; UAZ. 18-20, Interrad, 1994).

The Alakircay Synthetic, the Candir, the Kocular Sections and the Generalised Section of Antalya Nappes (GSAN) have close resemblance to each other (Fig. 7). The oldest formation observed in these sections is the Lordlar Formation of late Cambrian-early Ordovician age. It mainly contains an alternation of sandstones and shales with rare limestone beds. In these sections, the thick Yugluktepe Formation of late Permian age unconformably overlies the Lordlar Formation and is mainly composed of limestones with rare quartzite and shale intercalations. The same unit is called as the Dinek Formation in the Alakircay, the Candir and the Kocular Sections. However, the base of the formation is not visible in these latter sections. The Permian limestones are unconformably overlain by the Scythian-early Anisian Kesmekopru Formation. It is composed of marls with thin limestone intercalations, claystones and clayey limestones in the Alakircay (Senel, 1997b), the Candir and the Kocular Sections (Senel et al., 1992; 1996). The Scythian-Anisian succession represents the lower part of the Sapadere Formation in GSAN (Ozgul, 1983). It is subdivided into two members: the Scythian Beslengiller Member which is composed of oolitic and stromatolitic limestone and the Scythian-Anisian Taslica Member which is composed of clayey limestone and shale at the base and shale with intraformational conglomerate and debris flow deposits at the top. The latter deposits were

ascribed to the rifting in this time interval (Ozgul, 1983; Fig. 7)

All the Scythian-Anisian rock units are unconformably overlain by the late Ladinan Tesbihli Formation which contains an alternation of cherts and shales in the Alakircay (Senel, 1997b), the Candir and the Kocular Sections (Senel et al., 1992, 1996). The same unit is called as the Tirlar Member of the Sapadere Formation in GSAN (Ozgul, 1983). At its type locality, this part is represented mainly by mudstones with rare and generally broken radiolarian fauna. But 18 km. southeast of the type locality of the Tirlar Member, in the Sugozu Measured Section (Figs. 4, 7 and 14), another slice of the same unit contain well preserved late Ladinian to early Carnian Radiolarians (Bragin & Tekin, 1995) which will be explained in detail in the further chapters. In the GSAN, the Tirlar Member gradually passes to the Osmanderesi Member of the Sapadere Formation (Ozgul, 1983). It is mainly represented by an alternation of late Carnian-late Norian sandstones and shales with plant remains. This member correlates with the Candir Formation in the westerly-located sections. It sometimes contains limestones and cherty limestones (equivalent of the Gokdere Formation in the west) towards the upper part. Approximately 2 km. SW of the Sugozu Village, very close to the Sugozu Measured Section in this study, a slice of limestones and cherty limestone with 70 m observed thickness crops out (Bragin & Tekin, 1995). Because of the high calcification, Radiolarians could only be obtained by quick HF extraction. Although the preservation of the radiolarian fauna is not well enough, some of the forms are determined as follows;

94-UKT-53; *Betraccium deweveri* PESSAGNO & BLOME, *Livarella longus* YOSHIDA, *L. validus* YOSHIDA, *Pentactinocarpus sevaticus* (KOZUR & MOSTLER), *Pentactinisphaera rudis* BRAGIN (late Norian)

The upper part of the Ozgul 's (1983) GSAN is not well presented in the type locality. Elsewhere, according to Ulu (1989), based on the study at the middle part of the Alanya Tectonic Window around Gazipasa town and Sugozu Village, clastic sediments of the Norian is unconformably overlain by the late Cretaceous Karacukur Formation which is composed of pelagic limestones at the base and flyschoidal sediments at the top (Fig. 12).

The Tesbihli Formation gradually passes into mainly the Gokdere and the Karadere Formations in the Alakircay and the Candir Sections. The Karadere Formation is represented by basalts, spilites and spilitic basalt. Its age varies from Ladinian to Norian in a regional scale. In this study, abundant latest Carnian to early Norian Radiolarian and conodont assemblages are obtained from the limestones and cherty limestones (the Gokdere Formation) that overly the ocean floor basalts (the Karadere Formation) in the Yaylakuzdere Measured Section. The biostratigraphy and lithological properties of the Gokdere Formation will be presented in detail in the further chapters. Towards the upper part of the section in the Alakircay and the Candir Sections, the Candir Formation becomes more dominant. These two sections terminate with Cevlim and the Kecili Formations of Campanian and Maastrichtian age (Fig. 7).

The late Triassic part of the succession was called as the Darioglu Formation by Senel et al (1992) in the Kocular Section. It comprises an alternation of cherts, limestones, calciturbidites, sandy-clayey limestones, sandstones, siltstones, claystones with rare basic volcanic rocks. The contact relation between the Darioglu Formation and the overlying Barak Radiolarite is not clear. However, Senel et al. (1992) suggests an unconformity between these two units. The Barak Radiolarite is composed of an alternation of bedded cherts and shales. The sample from the upper part of the unit yielded the following fauna;

95-UKT-48; *Acaeniotyle* ex. gr. *diaphorogona* FOREMAN, *Acaeniotyle umbilicata* (RUST), *Alievium helenae* SCHAAF, *Angulobracchia portmanni* s.l. BAUMGARTNER, *Archeodictyomitra* ? *lacrimula* (FOREMAN), *Cecrops septemporatus* (PARONA), *Mirifusus dianae* s. l. (KARRER), *Sethocapsa trachyostraca* FOREMAN, ? *Syringocapsa coronata* STEIGER, *Thanarla elegantissima* (CITA), *T. pulchra* (SQUINABOL),

Pantanellium sp., *Pseudodictyomitra* sp., *Praeconocaryomma* sp., *Xitus* sp. (late Vallanginian-late Hauterivian, U. A. Z . 18-20; Interrad, 1994)

The Barak Radiolarite is conformably overlain by the Yaslantas Formation. It is mainly composed of calciturbidites with rare limestones intercalations. The age of this formation is possibly late early Cretaceous based on its stratigraphical position (Senel et al., 1996). The Yaslantas Formation is unconformably overlain by the Campanian Cevlim Formation that is made up of calciturbidites, cherts and limestones. The sample derived from the limestone beds of this formation yielded the following fauna;

95-UKT-35; *Alievium gallowayi* (WHITE), *Dictyomitra formosa* SQUINABOL, *D. koslovae* FOREMAN, *Patelulla verteroensis* (PESSAGNO), *Pseudoaulophacus lenticulatus* (WHITE) (Campanian)

The Kecili Formation of late Campanian-Maastricthian age conformably overlies the Cevlim Formation in the Kocular Section (Fig. 7).

2. 1. 1. 2. 3. The Tahtalidag Nappe

This nappe system is mainly represented by Paleozoic and Mesozoic platform type sedimentary deposits as well as Triassic pelagic-hemipelagic sediments. It does not include the Triassic clastic rocks, which are one of the main characteristic features to differentiate it from the other Antalya Nappes (Senel et al., 1996). Its equivalents are as follows; the "Tahtalidag Unit" (Brunn et al., 1971), the "Dulup Unit" (Dumont & Kerey, 1975), the "Katrandagi Unit" (Monod, 1977) the "Kemer Zone" (Woodcock & Robertson, 1977). Finally Senel et al (1992) redefined and generalised it as the "Tahtalidag Nappe".

Eleven different sections have been chosen to describe the general stratigraphy and basin configuration of the Tahtalidag Nappe System (Figs. 4 and 8). These are: the Tahtalidag Synthetic Section from the western part of the Antalya Gulf (Senel, 1997b), the Dutdibi, the Dulupdagi, the Gume, the Yumaklar, the Akpinar, the Erenler, the Ovacikdagi Sections (Senel et al., 1992, 1996) from the Isparta Angle, the Katrandagi, the Kavzandagi, the Gundogmus Sections (Senel et al, 1992, 1996) from the Flysch Corridor. Since this nappe system is less well-known and rarely exposed at the Alanya Tectonic Window, it will not be evaluated herein detail.

The oldest unit of the Tahtalidag Nappe is the lower Cambrian Kocaosman Formation. It is represented by quartzitic sandstones in the Dulup Section. The Caltepe Formation of middle Cambrian age is characterized by dolomites and limestones in the Tahtalidag and the Dulupdag Sections. The Seydisehir Formation of early Ordovician- late Cambrian age conformably overlies this formation and is made up of sandstones, siltstones and claystones. It is exposed in the Tahtalidag, the Ovacikdag, the Kavzandagi and the Gundogmus Sections. Late Ordovician Sariyardere and the Silurian Sapandere Formations could only be found in the Tahtalidag Section. In the other sections (the Ovacikdag, the Kavzandagi and the Gundogmus), the Seydisehir Formation is unconformably overlain by the Guneyyaka Formation. The Sariyardere Formation is represented by shales and the Sapandere Formation is composed of sandstones and sandy dolomites. A small outcrop of the early Silurian Bozsenir Formation unconformably overlies the Seydisehir Formation and comprises sandstones and graptolite bearing shales in the Gundogmus Section (Senel et al., 1996). The Guneyyaka Formation of early and middle Devonian age unconformably overlies the Sapandere Formation in the Tahtalidag Section, the Seydisehir Formation in the Ovacikdagi, the Kavzandagi Sections and the Bozsenir Formation in the Gundogmus Section. The main lithologies of this formation are sandstones, shales, limestones and thick dolomites. The Hocaninsuyu Formation of late Devonian age is composed of sandstones, siltstones and claystones in the Tahtalidag Section. The late Permian units unconformably overly the older formations and is called as the Pamucakyayla Formation (quartz sandstones), the Kizilbag Formation (dolomites) in the Tahtalidag Section,

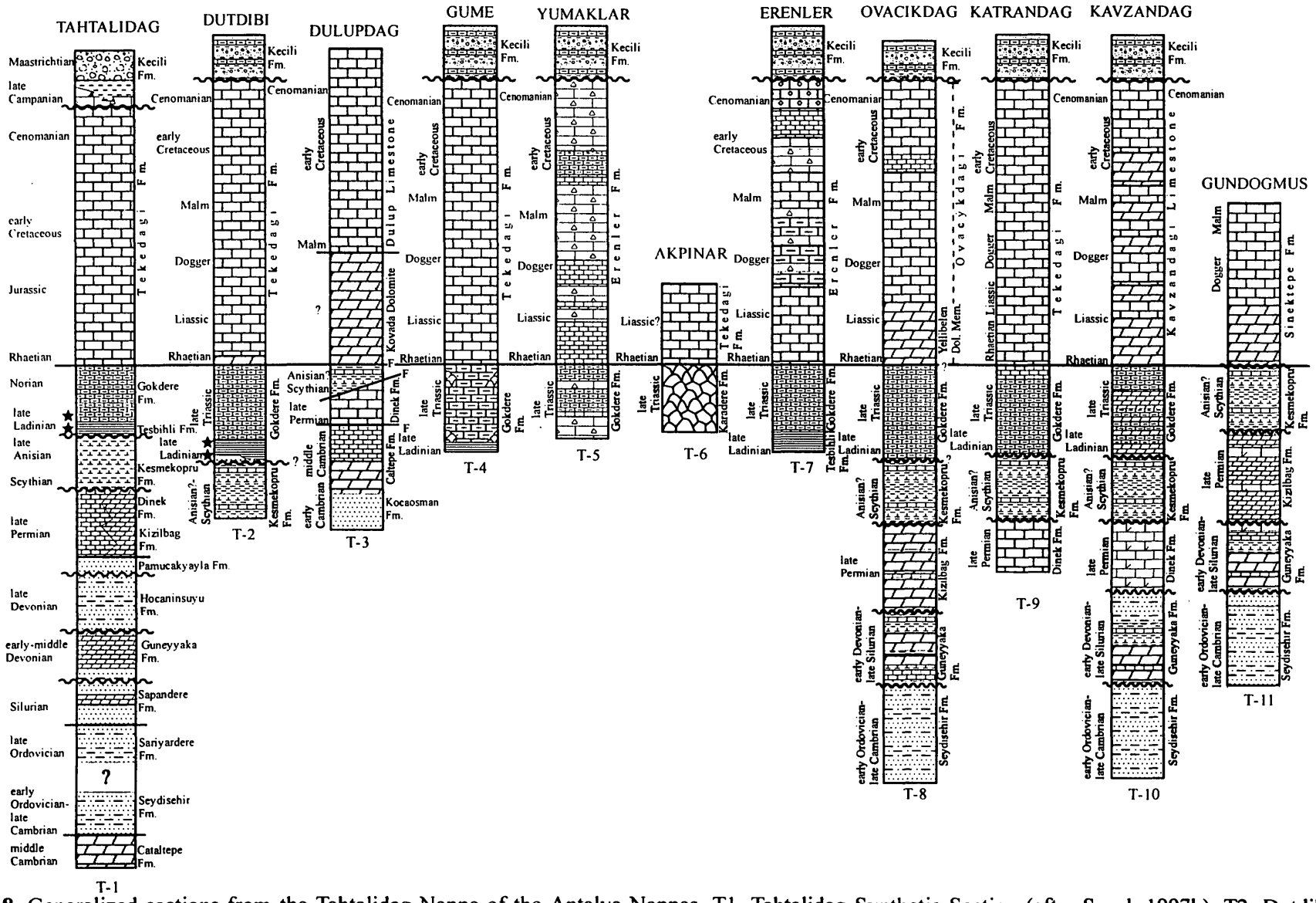


Figure 8. Generalized sections from the Tahtalidag Nappe of the Antalya Nappes, T1. Tahtalidag Synthetic Section (after Senel, 1997b), T2. Dutdibi, T-3. Dulupdag, T-4. Gume, T-5. Yumaklar, T-6. Akpinar, T-7. Erenler, T-8. Ovacikdag, T-9. Katrandag, T-10. Kavzandag, T-11. Gundogmus sections (after Senel et al., 1992, 1996). Datum level is base of Rhaetian. For lithology see Figure 6. (Not to scale).

the Dinek Formation (limestones with Mizzia) in the Tahtalidag, the Dulupdagi, the Katrandagi and the Kavzandagi Sections, the Kizilbag Formation in the Ovacik and the Gundogmus Sections. Both lower and upper contacts of the Dinek Formation are tectonically controlled in the Dulupdagi Section (Senel et al., 1992, 1996; Senel, 1997b; Fig. 8).

The Kesmekopru Formation of Scythian-Anisian age unconformably overlies the older units and includes marls with rare limestone levels in the Tahtalidag, the Dutdibi, the Dulupdagi, the Ovacikdagi, the Katrandagi, the Kavzandagi and the Gundogmus Sections (Fig. 8).

The Tesbihli Formation is composed of an alternation of cherts and shales and unconformably overlies the Kesmekopru Formation in the Tahtalidag Section. From the middle part of this formation, late Ladinian is assigned based on the following fauna;

96-UKT-320; *Mulleritortis cochleata* s.l. (NAKASEKO & NISHIMURA), *Triassocampe* spp.

The Tesbihli Formation gradually passes upward to the Gokdere Formation. It consists of cherty limestone. One of the samples derived from this part yielded the following fauna in this section;

96 UKT-326; *Xiphotheca longa* KOZUR & MOCK, *Capnodoce* sp., ?*Capnuchosphaera* sp., *Paronaella* sp., *Crucella* sp. (late Carnian-middle Norian)

The same formation could be detected in the Dutdibi, the Gume, the Yumaklar, the Erenler, the Ovacikdagi, the Katrandagi and the Kavzandagi Sections and is represented by an alternation of bedded cherts and shales at its base and an alternation of cherty limestones and limestones at the top. The following fauna are recovered from two samples derived from the bedded cherts of this formation in the Dutdibi Section;

94-UKT-148 (lower sample); *Muelleritortis firma* GORICAN, *Pseudostylosphaera inaequata* (BRAGIN), *Plafkerium longidentatum* KOZUR & MOSTLER (early late Ladinian).

94-UKT-155 (upper sample); *Muelleritortis cochleata* (NAKASEKO & NISHIMURA), *Pseudostylosphaera inaequata* (BRAGIN), *Spongostylus carnicus* KOZUR & MOSTLER, *Triassocampe* sp. (late late Ladinian).

The base of the Akpinar Section is represented by the Karadere Formation showing a close resemblance to the Alakircay Nappe. The Jurassic-Cretaceous carbonate sediments however, are quite different from those of the Alakircay Nappe (Fig. 8).

The Rhaetian-Cenomanian succession of the Tahtalidag Nappe is mainly represented by platform carbonates and sometimes calciturbidites in all Tahtalidag Nappe Sections. This part is called in different sections as follows; the Tekedagi Formation (neritic limestones) in the Tahtalidag, the Dutdibi, the Gume, the Akpinar, the Katrandagi Sections; the Kovada Dolomite and the Dulup Limestones (neritic carbonates) in the Dulupdagi Sections; the Erenler Formation (limestones and dolomitic limestones with brecciated limestone intercalations) in the Yumaklar and the Erenler Sections; the Yellibelen Dolomite and the Ovacik Formation (neritic limestones) in the Ovacikdagi Section; the Kavzandagi Limestones (dolomite and limestones) in the Kavzandagi Section and the Sinektepe Formation (dolomite at the base, neritic limestones at the top) in the Gundogmus Section (Senel et al., 1992, 1996; Senel, 1997b; Fig, 8).

The Rhaetian-Cenomanian carbonates of the Tahtalidag Nappe are unconformably overlain by the late Campanian-Maastrichtian Kecili Formation in the Tahtalidag, the Dutdibi, the Gume, the Yumaklar, the Erenler, the Ovacikdagi, the Katrandagi and the Kavzandagi Sections (Fig. 8).

2. 2. Geological Outline of the Ankara Region

Many local and regional studies were carried out by different authors around Ankara region, e. g.; Bailey & Mc Callien (1950, 1953), Erk (1977), Erol (1956), Boccaletti et al., (1966), Sestini (1971), Norman (1972, 1973), Calgin et al. (1973), Capan & Buket (1975), Batman et al. (1978), Unalan (1981), Akyurek et al. (1984),

Kocyigit (1987, 1992) and Kocyigit & Tokay (1985).

The term "Ankara Melange" was first used by Bailey & Mc Callien (1950). According to these researchers, it was formed by the tectonic separation of "Anatolian Nappe" moving from north to south and its rock assemblage belongs to Triassic-Jurassic. The Ankara Melange could be traced in NNE-SSW direction between Ankara City and Kizilirmak River as a belt, which is surrounded by Tertiary sedimentary formations (Fig. 9). The width of this belt is approximately 50 km.

The Ankara Melange is a supergroup, which is subdivided in two structural units;

a. The pre-Liassic regional metamorphic sequences are generally called "Karakaya Group". The lower part of this group is composed of sericite schist, chlorite schist, metasandstone, metaconglomerate and metavolcanite. This unit was affected by greenschist metamorphism and named as "Paleozoic Metamorphic-Schist" (Calgin et al., 1973), "Melange with Metamorphic Blocks" (Norman, 1973), "Emir Formation of Ankara Group" (Akyurek et al, 1984), "Upper Karakaya Nappe" (Kocyigit, 1987) and "Eymir Structural Complex" (Kocyigit, 1992). Upper part of this group is very similar to lower part but contains many Carboniferous and Permian blocks in it. This unit was individually named as the "Dikmen Greywacke" (Erol, 1956); the "Ankara Flysch" (Erk, 1977); the "Melange with Calcerous Blocks" (Norman, 1973); the "Composite Serie" (Calgin et al., 1973); the "Elmadag and Kecikaya Formation of Ankara Group" (Akyurek et al., 1984); the "Lower Karakaya Nappe" (Kocyigit, 1987); and the "Karakaya Group" (Kocyigit, 1992).

The Karakaya Group is unconformably overlain by a Liassic- late Cretaceous carbonate sequence. It is a post metamorphic transgressive sequence and generally starts with basal conglomerates which gradually change into sandstones and culminates with limestone and cherty limestones at the top. This unit was named as follows; the "Lalelik Formation" (Batman, et al., 1978); the "Hasanoglan and Akbayir Formations" (Akyurek et al., 1984); the "Ankara Group" (Kocyigit, 1987).

b. The Senonian Ophiolitic Melange is a chaotic tectonosedimentary mixture of various blocks of different age, origin, facies and size set in an intensely sheared, semischistose or mylonitized fine grained matrix, composed of ophiolitic sandstone, shale, turbidite and pelagic mudstone. The "Melange with Ophiolitic Blocks" (Boccaletti et al., 1966); the "Irmak Formation" (Norman, 1972), the "Anatolian Nappe" (Kocyigit & Tokay, 1985) are the synonyms of this unit suggested by different authors. This melange contains numerous blocks of radiolarites.

Different ages have been ascertained from the blocks of mudstone and chert at the road-cut of the Ankara-Istanbul highway and the Eryaman road (17 km. west of Ankara; Figs. 9 and 10) in the Ankara Ophiolitic Melange. One of the most common constituents of the blocky melange is radiolarites. Red to pink chert blocks with a rich late Norian radiolarian assemblage will be described in detail in the following chapters. One of the blocks with red to brown thin-bedded cherts and silicified mudstones contain early Jurassic Radiolarians *Parahsuum simplum* YAO. In the same road cut, red cherty mudstone intercalated with red, pink and light grey cherts includes Kimmeridgian-Tithonian Radiolarians with an assemblage of *Ristola altissima* (RUST), *Sethocapsa cetia* FOREMAN and *Podocapsa amphitreptera* FOREMAN. Early Cretaceous Radiolarians such as *Thanarla conica* (ALIEV), *Alievium helenae* SCHAAF and *Pseudodictyomitra carpatica* (LOZYNIAK) were obtained from red cherts and late Albian-Turonian Radiolarians *Pseudodictyomitra pseudomacrocephala* (SQUINABOL), *Thanarla veneta* (SQUINABOL) were also obtained from another red chert block (Bragin & Tekin, 1996).

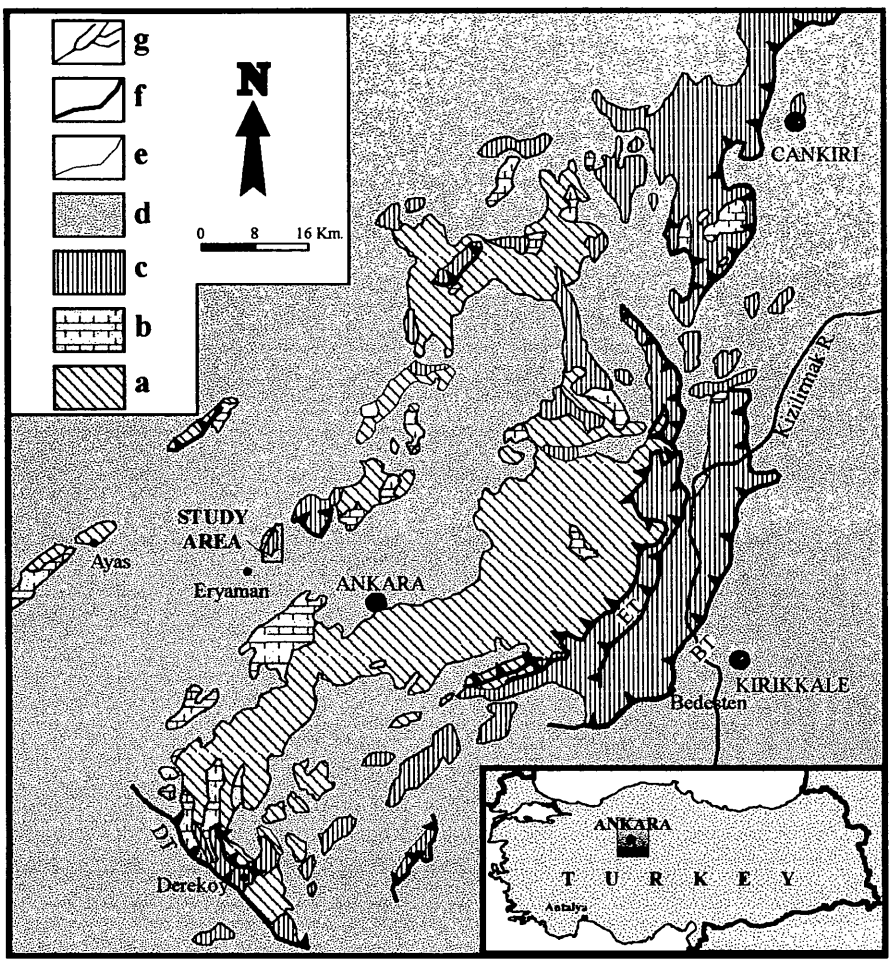


Figure 9. Simplified geologic map showing major rock units of Ankara Melange. a. pre-Liassic "Karakaya Group", b. Jurassic-Cretaceous sedimentary sequence, c. Senonian "Ophiolitic Melange", d. Tertiary-Recent cover rocks, e. Normal contact, f. Thrust to reverse fault,g Drainage, BT: Bedesten Thrust Fault Zone DT: Derekoy Thrust Fault Zone, ET: Elmadag Thrust Fault Zone (modified after, Kocyigit, 1992).

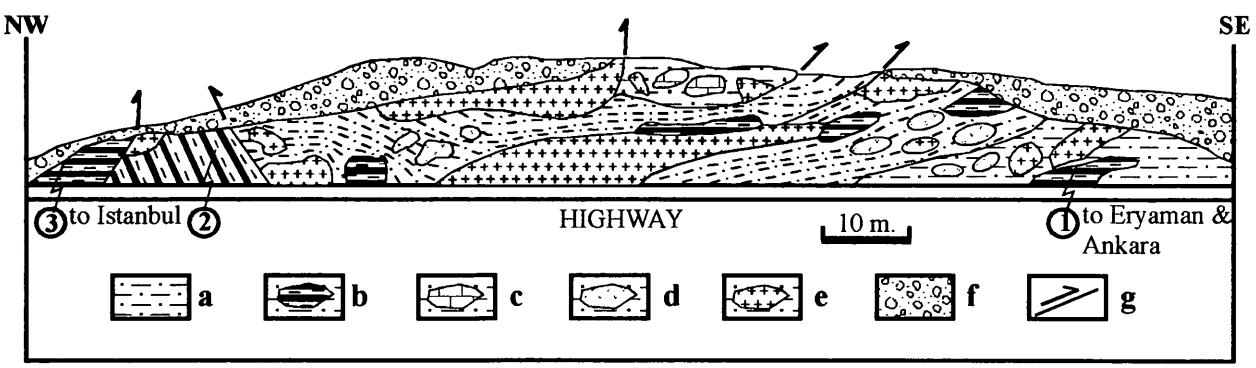


Figure 10. Generalized cross-section of a road-cut between Eryaman and Istanbul, a. Volcanic matrix, b. Blocks of mudstone and chert with 1. late Norian, 2. early Jurassic, 3. Kimmeridgian-Tithonian radiolaria, c. Blocks of limestones, d. Blocks of volcanics, e. Blocks of serpantinised gabbros, f. Tertiary-recent cover rocks, g. Tectonic contact.

3. DEFINITION OF THE MEASURED SECTIONS AND SAMPLES

3. 1. The Sugozu Measured Section

The Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes is located 2 km. to the southwest of the Sugozu Village, on the western cliff of the Bickicidere Creek (Figs. 11, 12 and 13A) and named after Sugozu Village (Alanya P28-b2 Quadrangle, Start point: E. 30600, N. 49050; End Point: E. 30750, N. 49100). The lower and upper boundaries of the measured section are always faulted (Figs. 12, 13 A, B and 14) and surrounded by alluvial terrace sediments.

The Sugozu Measured Section corresponds to the Tirlar Member of the Sapadere Formation in the Generalised Columnar Section of the Antalya Nappe (GSAN) (Ozgul, 1983) from the Alakircay Nappe of the Antalya Nappes with respect to its lithology and fossil content. At its type locality (approximately 18 km. northwest of Sugozu Measured Section), this unit consists of an alternation of Anisian shales and limestones which is unconformably overlain by unsorted breccia and red mudstones yielding very rare Radiolarians, while the latter gradually changes to limestone at the top (Figs. 4 and 6).

In the Sugozu Measured Section, the lower unsorted breccia and upper limestone sequences are not recognized. It is always represented by an alternation of red-reddish brown, thin to medium bedded cherts, silicified mudstones and mudstones both in sections 1 and 2 (Figs 13B and 14).

3. 2. The Haciyunuslar Measured Section

The Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe is named after Haciyunuslar Village and lies at Konya N28-c4 quadrangle (Start point: E. 03200, N. 39600; End point: E. 03750; N. 36500). It is located at the west of Goksu River and Hadim-Bozkir road (Figs.11 and 15). It is very close to the Ozgul's (1997) Sogucak Section (Figs. 4 and 5).

The base of the section is commonly covered by fluvial deposits. Main part of the Haciyunuslar Measured Section is represented by Huglu Tuffites. It is mainly characterized by an alternation of green to brown tuffs, tuffites and basic volcanics with limestone intercalations. Large, beige to dirty beige, thick bedded, brecciated limestone blocks with benthic foraminifera are present very close to the base of the Huglu Tuffites. The limestone intercalations at the base of the Huglu Tuffites are mainly red to reddish brown, thin to medium bedded and contain moderately preserved but diverse Radiolarians (Figs. 16A and 17). After these levels, rare limestone intercalations present in the tuff-tuffite-basic volcanic beds. The limestone intercalations at the upper part of the Huglu Tuffites are mainly grey-pale grey-beige, thin to medium bedded with many filaments and calcified Radiolarians. Some of the limestone bed contains remains of Ammonites (Figs. 16B and 17) at the top of the Huglu Tuffites.

The Huglu Tuffites are gradually transitional to the Huglu Limestone towards the upper part. These are mainly thin-bedded, red to grey, cherty limestones with rare shale intercalations (Figs.16B and 17). The upper part of the section is highly fractured so that within short distances, the Huglu Limestone structurally repeats 3-4 times.

3. 3. The Yaylakuzdere Measured Section

The Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes is named after Yaylakuzdere Village. The base of the section is very close to this village (approximately 400 meters west of the village, Antalya O24-c3 quadrangle, Start point: E.

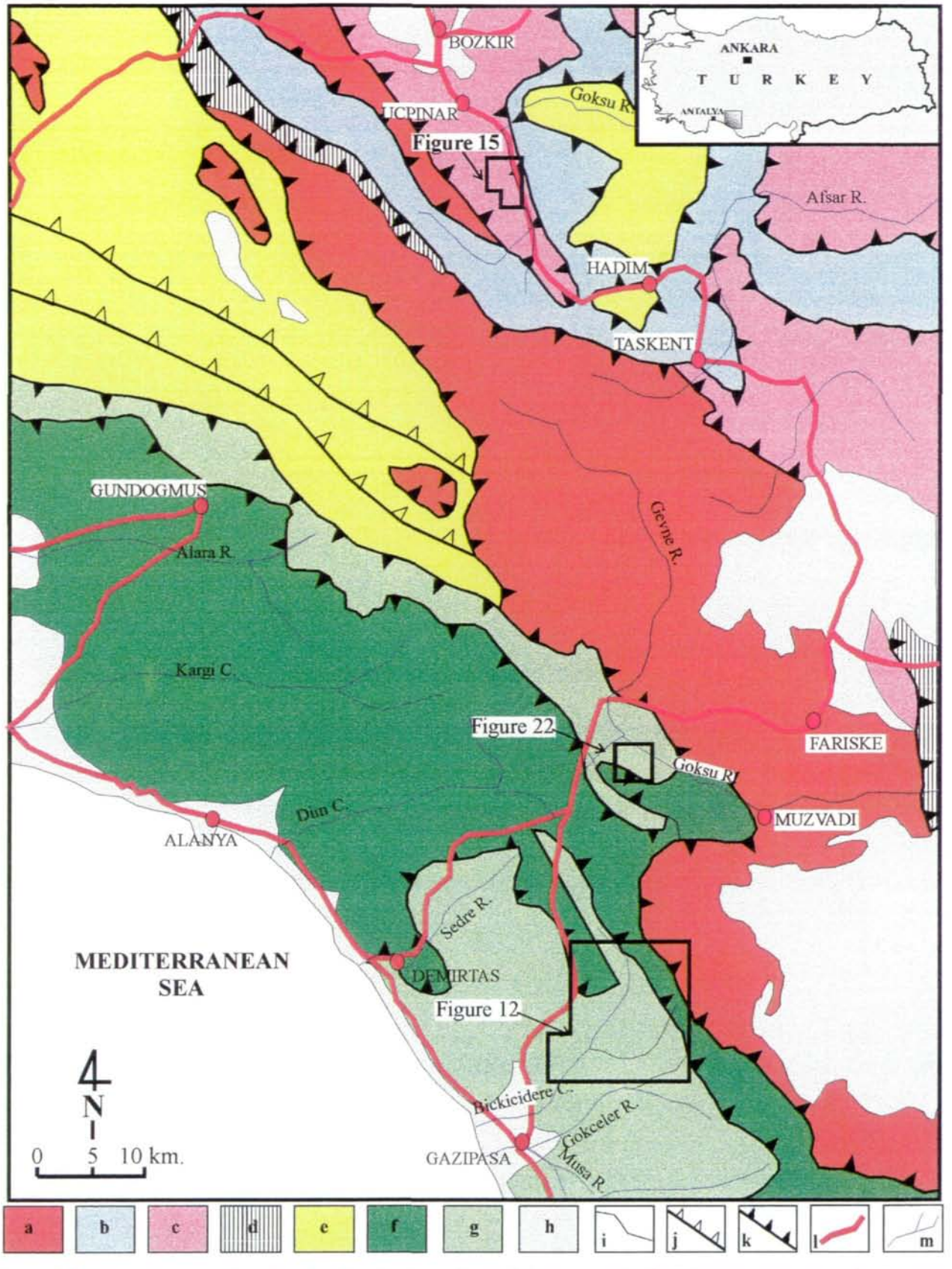


Figure 11. Schematic map showing the distribution of autochthonous and allochthonous sequences in the area between Western and Central Taurides (simplified and revised after Ozgul, 1984a). a. Hadim Nappe, b. Bolkardagi Nappe, c. Beysehir-Hoyran Nappe, d. Ophiolitic Nappes belonging to the Northern Branch of Neo-Tethys (Dipsizgol Ophiolite etc.), e. Beydaglari-Anamas-Akseki Autochthon, f. Alanya Nappe, g. Antalya Nappes, h. Post-Eocene cover rocks, i. Normal contact, j. Thrust, k. Overthrust, l. Main roads, m. Drainage system.

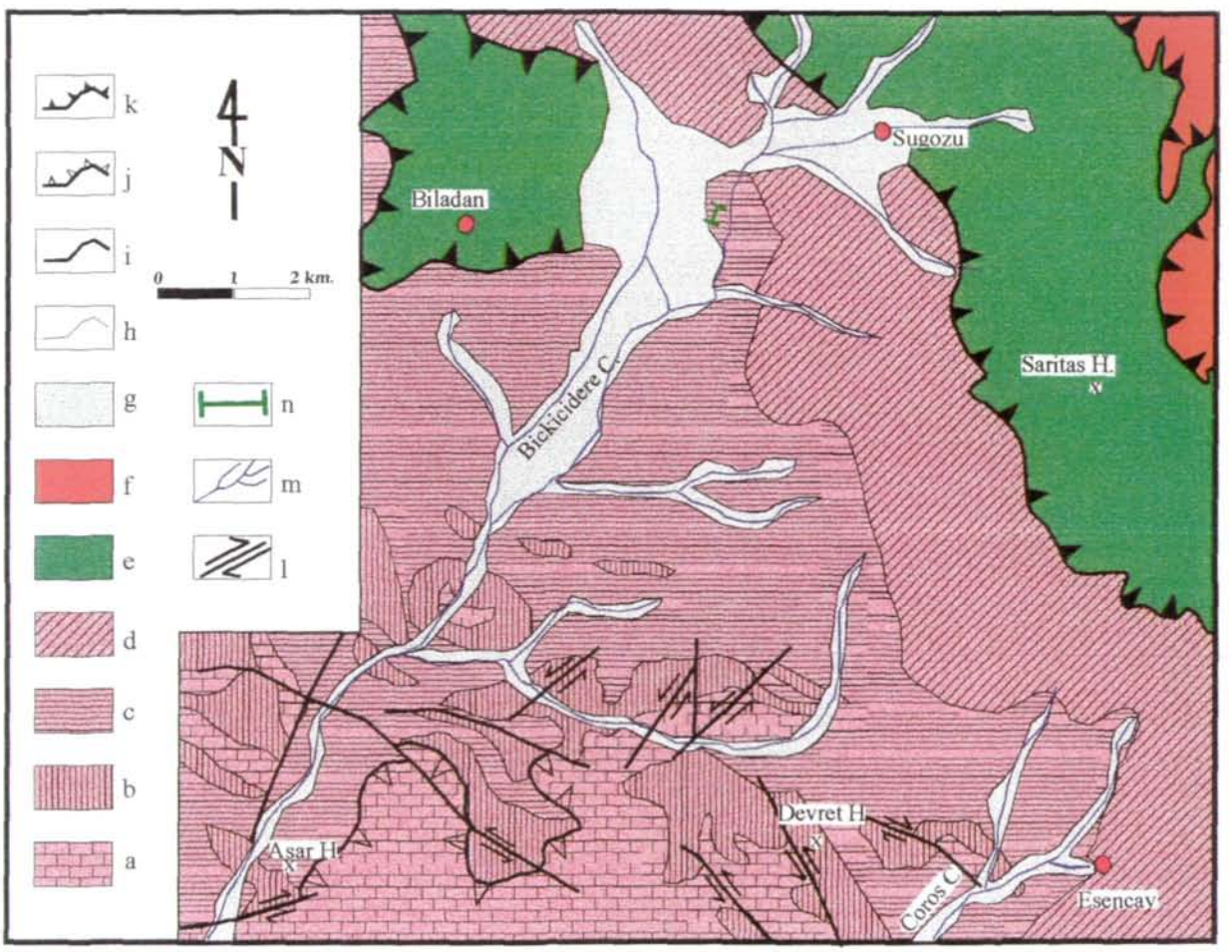


Figure 12. Map showing the location and the geology of the Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes and its surrounding. a-d. Alakircay Nappe of Antalya Nappes; a. late Cambrian-early Ordovician Lordlar Formation (mainly sandstone,shale), b. late Permian Yüglüktepe Formation (mainly limestone-shale), c. Triassic undifferentiated Sapadere Formation (mainly shale-sandstone-limestone-chert), d. Probable Cretaceous rock units (Karacukur Formation of Ulu, 1989), e. Alanya Nappe, f. Hadim Nappe, g. Post-Eocene cover rocks, h. Normal contact, i. Fault, j. Thrust, k. Overthrust, l. Strike-slip fault, m. Drainage system, n. Location of the Sugozu Measured Section (revised and simplified after Ulu, 1989)

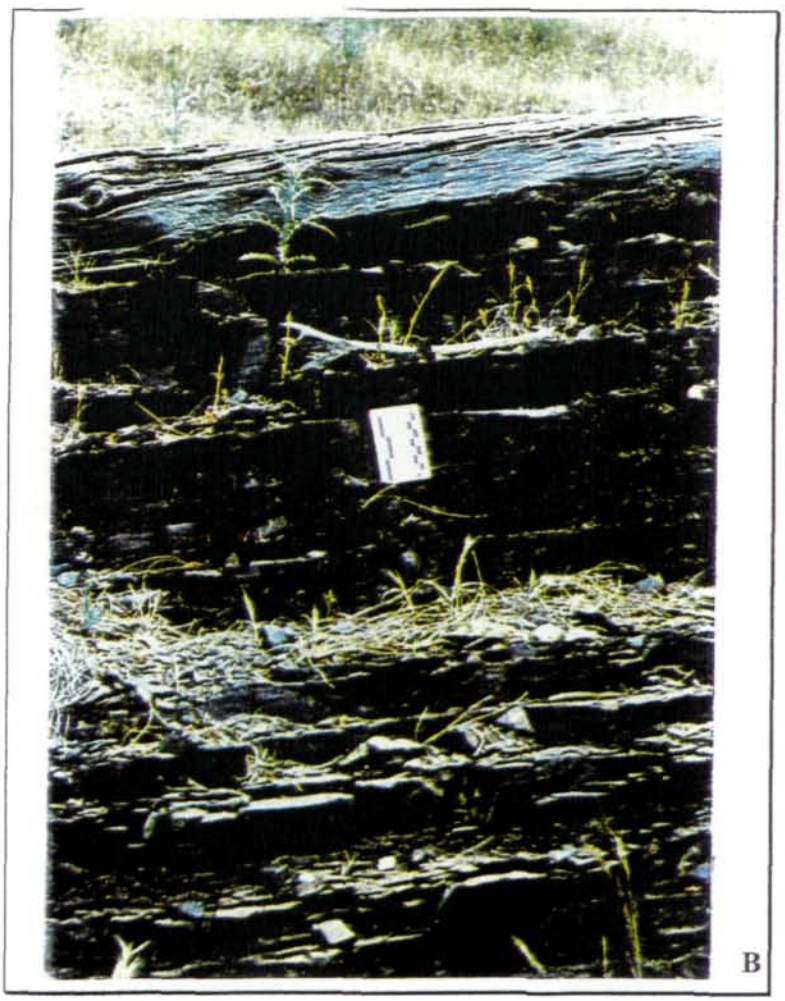


Figure 13 A. General view of the Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes and its vicinity, view towards the west. a. Alluvial terrace sediments, b. Late Ladinian- early Carnian Tirlar Member of the Sapadere Formation (succession is overturned), c. Late Triassic Osmanderesi Member of the Sapadere Formation, mainly an alternation of sandstones and shales with plant remains.

B. Detail of the basal part of the Sugozu Measured Section 1 showing an alternation of thin to medium bedded silicified mudstones, cherts and mudstones.

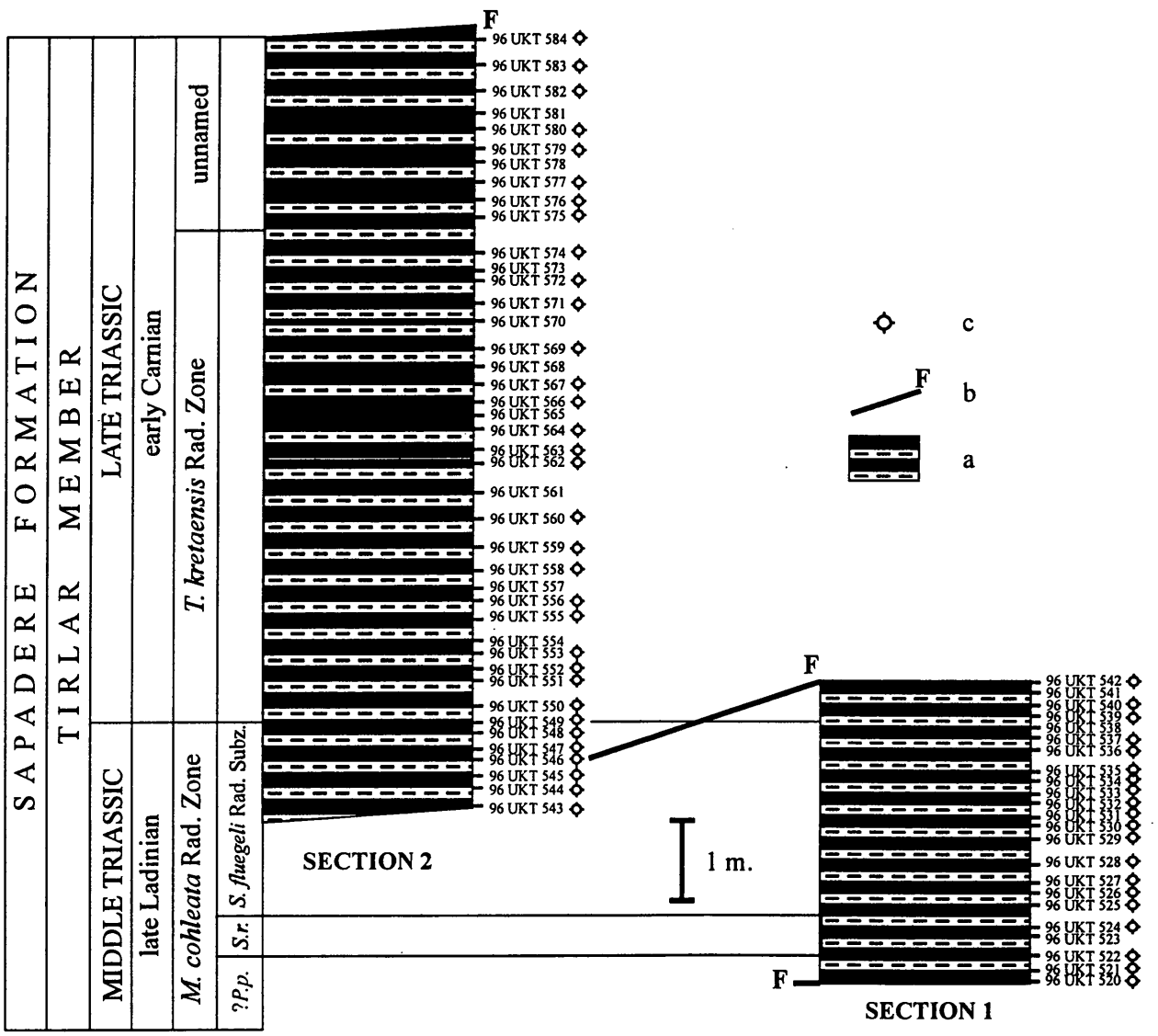


Figure 14. Columnar section of the Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes with sample locations (succession is overturned). a. Alternation of cherts, silicified mudstones and mudstones, b. Fault, c. Radiolaria occurrence. Abbreviations; ? *P.p.*: possible *Pterospongus priscus* Rad. Subzone, *S.r.*: *Spongoserrula rarauana* Rad. Subzone.

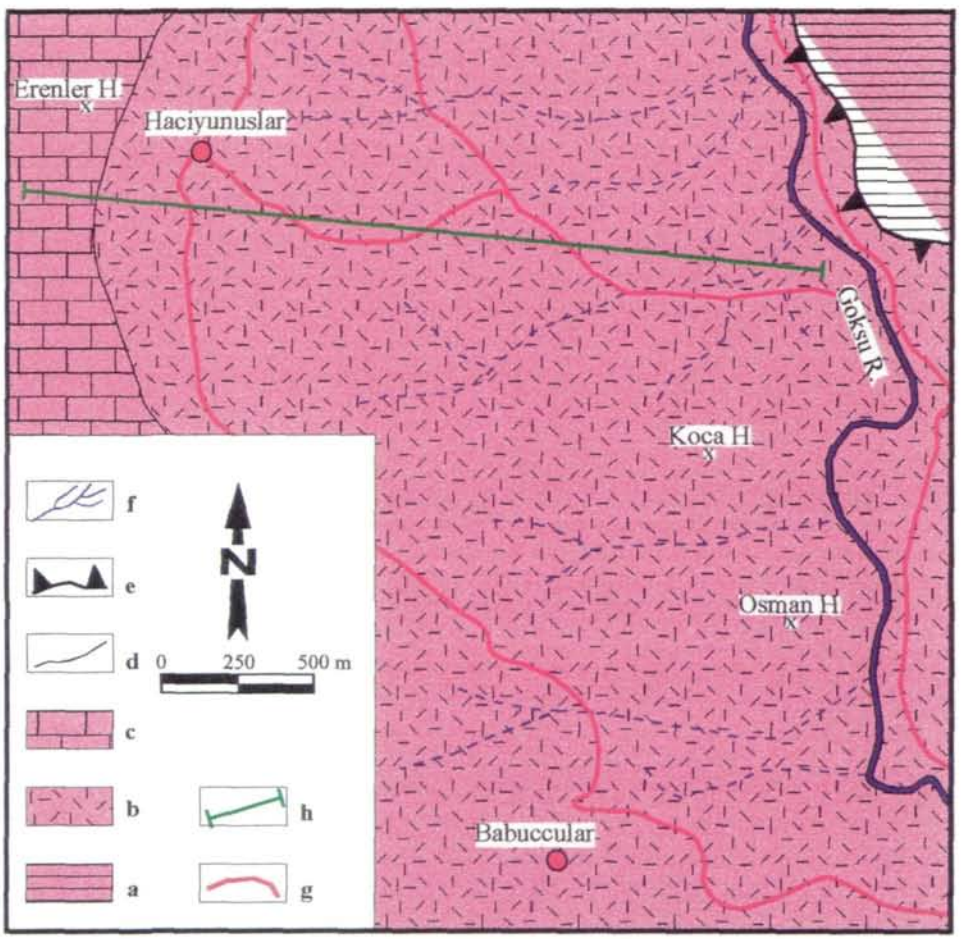


Figure 15. Geological map of the Haciyunuslar Area and the location of the measured section from the Huglu Unit of the Beysehir-Hoyran Nappe. a. Kayabasi Unit of the Beysehir-Hoyran Nappe, b-c: Huglu Unit of the Beysehir-Hoyran Nappe; b. Huglu Tuffites, c. Huglu Limestone, d. Normal contact, e. Overthrust, f. Drainage system, g. Main Roads, h. Location of the Haciyunuslar Measured Section (revised after Ozgul, 1969).

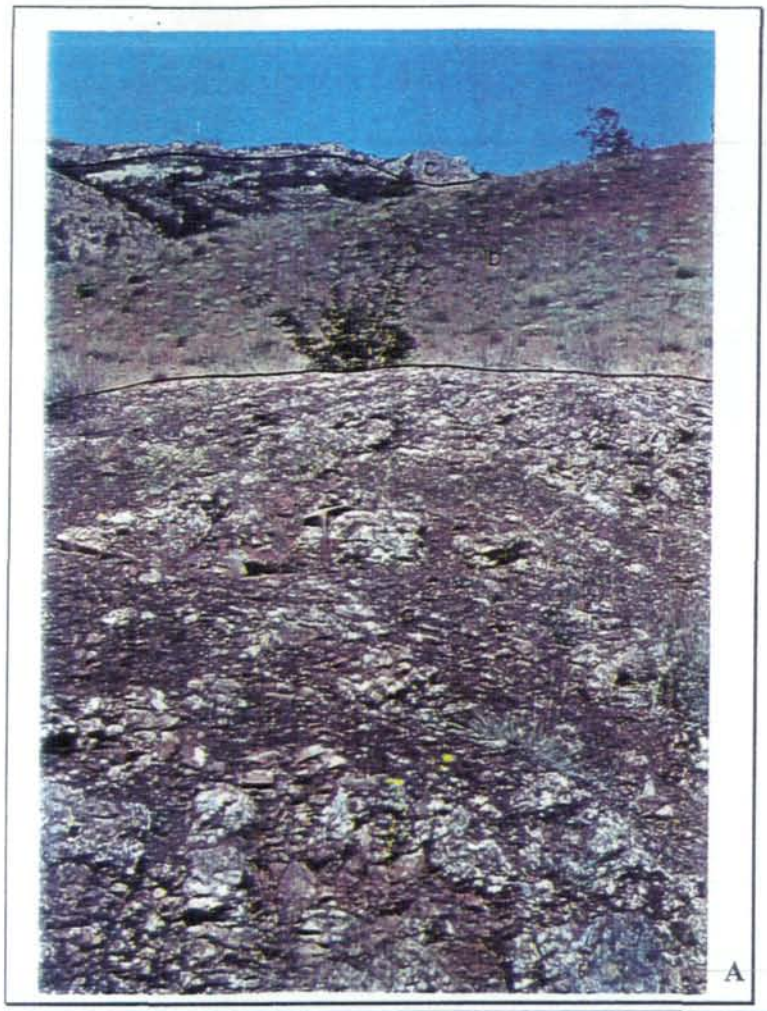
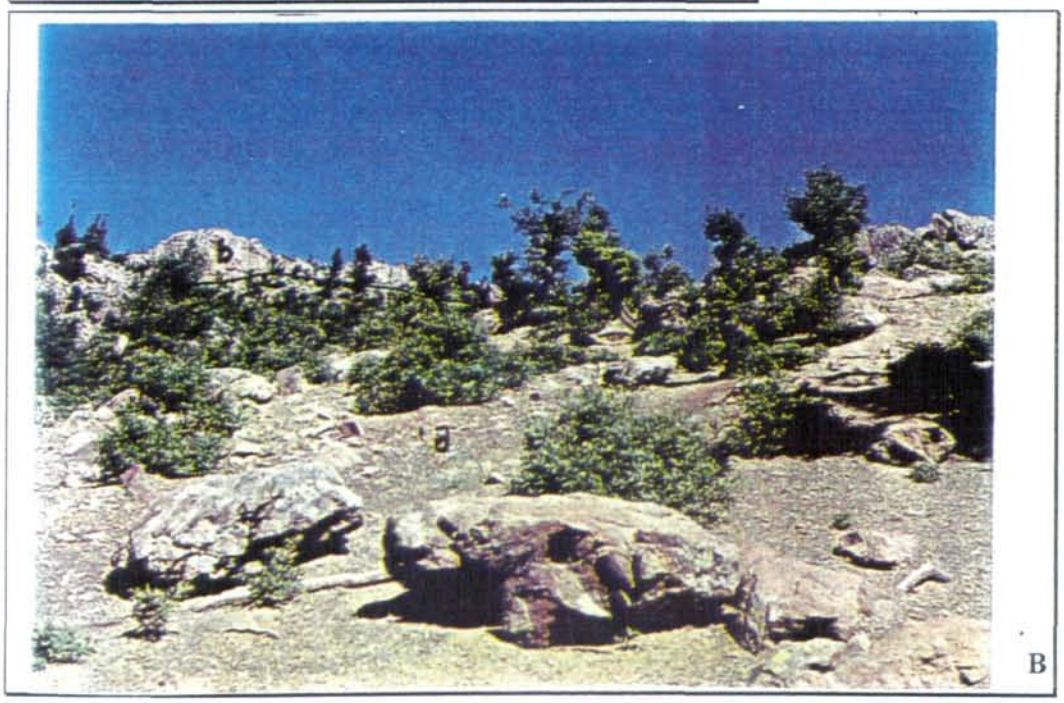


Figure 16 A. General view of the Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe and its vicinity. View from the close the basal part of the section, towards the west. a. Thin to medium bedded red limestone beds with moderately preserved middle Carnian Radiolarians in Huglu Tuffites, b. Undifferentiated middle Carnian Huglu Tuffites, mainly an alternation of tuffs, tuffites and basic volcanics with limestone intercalations, c. Late Triassic-Cretaceous Huglu Limestone, mainly pelagic limestones with chert nodules.

B. Photograph showing the upper part of the Haciyunuslar Measured Section. a. Upper part of the middle Carnian Huglu Tuffites including limestone beds with ammonite fauna, b. Late Triassic- Cretaceous Huglu Limestone.



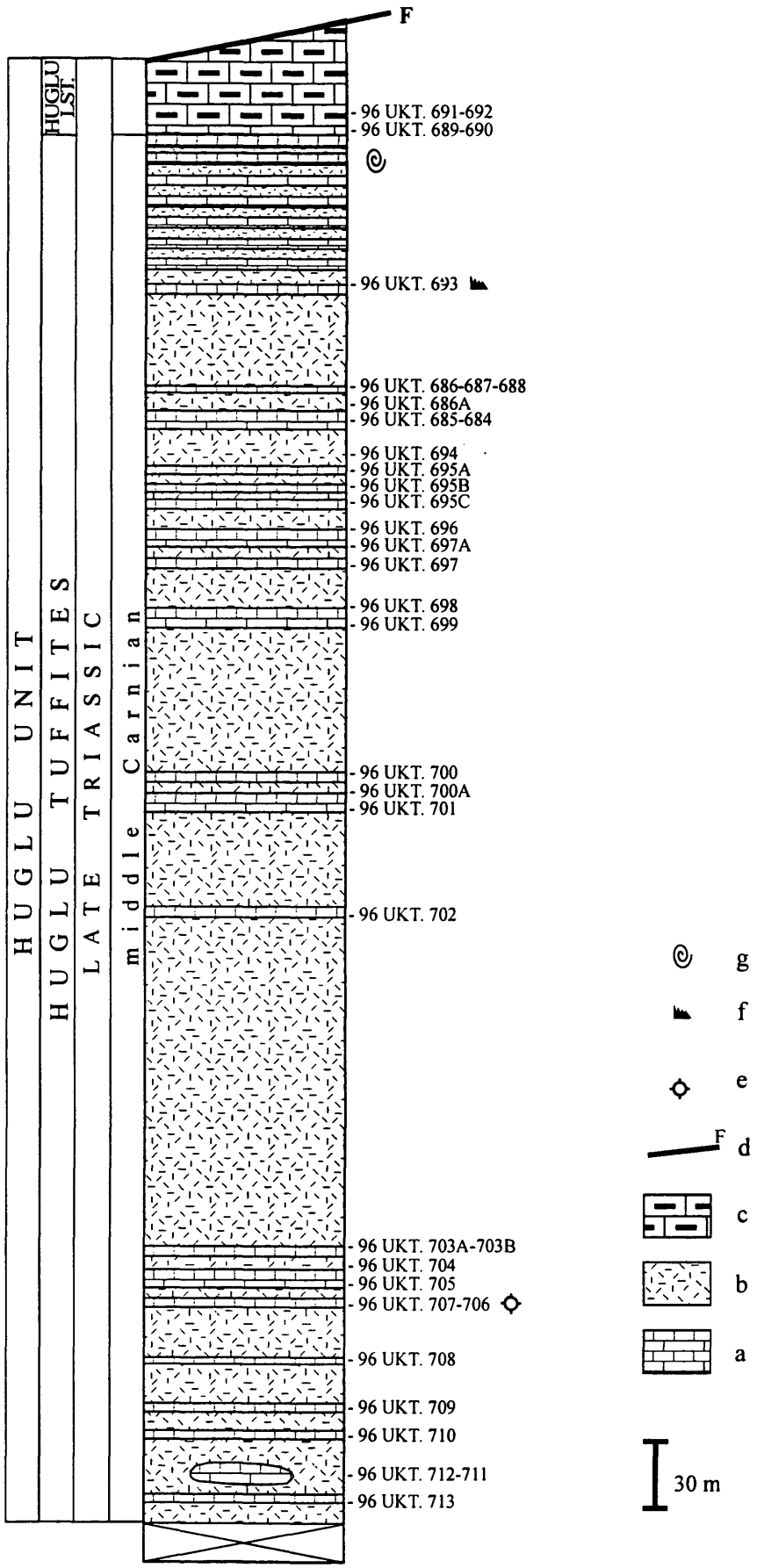


Figure 17. Columnar section of the Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe showing radiolaria, conodont and ammonite bearing samples, a. Limestone, b. Tuff, tuffite and basic volcanics, c. Thin bedded cherty limestone, d. Tectonic contact, e. Radiolaria, f. Conodont, g. Ammonite.

50800, N. 69600; End Point: E. 51150, N. 70000). The section is mainly measured along the Gurleyikdere Creek (Figs. 18, 19 and 20.A)

The thick, dark, ocean floor basalts (Karadere Formation) is the main characteristics of the basal part of the Yaylakuzdere Measured Section 1. Red limestone layers are observed within the well-developed pillow lavas in the basal part of the section. The overlying beds (Gokdere Formation) are mainly characterized by an alternation of thin to medium bedded, grey to beige limestones and green shales. At the lower part of the Gokdere Formation, a volcanic sill is present between two limestone levels. The upper part of the Yaylakuzdere Measured Section 1 contains an alternation of thin to medium bedded, grey- beige and sometimes yellowish grey to beige, thin to medium bedded, occasionally thick-bedded limestones and thin green shales (Figs. 20 A and 21). The limestones include many bivalves and Radiolarians.

The Yaylakuzdere Measured Section 2 is only represented by the Gokdere Formation and basal part of this section very similar to the upper part of the Yaylakuzdere Measured Section 1. Alternation of thin to medium bedded, grey to beige and sometimes yellowish coloured, bivalve and abundant Radiolarians bearing limestones and green to yellowish green shales are the main characteristic rocks of the lower part of the Yaylakuzdere Measured Section 2. The amount and the thickness of shale break decrease towards the upper part. The upper part of the Yaylakuzdere Measured Section 2 is mainly represented by limestones with black chert nodules. Limestones are mainly beige to grey coloured, thin to thick bedded with rare yellowish green shale intercalations (Figs. 20 B and 21).

3. 4. Sample from the Ankara Ophiolitic Melange

The Ankara Melange crops out at the road-cuttings of the Ankara-Istanbul highway and the Eryaman road (17 km. west of Ankara). It contains numerous blocks of serpentinized gabbroic rocks, pink micritic limestones, volcanics and mudstone-chert with Radiolarians in a highly deformed volcaniclastic matrix (Figs. 9 and 10). The studied late Norian block lies at the eastern edge of the road cut (Fig. 10). It is a relatively small block and is mainly composed of an alternation of thin-bedded, red cherts and mudstones. This block is slightly buried because of recent slumping.

3. 5. The Dikmetas Measured Section

The Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes is named after Dikmetas Village and lies approximately 1 km. southeast of the village (O 28-c3 Quadrangle; Start Point. E. 49950, N. 49675, End Point: E. 50060-N. 49750) (Figs. 11 and 22).

The base of the Dikmetas Measured Section (the Kasimlar Formation) includes an alternation of yellow to yellowish gray sandstones and shales with biohermal limestones intercalations (Figs. 23 A and 24). The contact of the Kasimlar Formation with the overlying Kayabuku Formation is covered in the section. The base of the Kayabuku Formation is represented by an alternation of thin to medium-bedded, gray to white limestones and thin to medium-bedded, red-bright to red cherts with abundant Radiolarians. Chert nodules are also frequently present in the limestone beds (Figs. 23 A and 24). This part is terminated by a medium-bedded, white to gray calciturbidite bed. The overlying levels are mainly characterized by thin to medium-bedded, pinkish limestone with occasional chert bands and nodules followed by a second white calciturbidite level (Figs. 23 A, B and 24).

After the second calciturbidite level, the colour of the lithologies drastically changes to green in the Kayabuku Formation. Characteristic lithologies of this part are an alternation of cherts and thin-bedded limestones. The upper part of this level is mainly covered, possibly due to a fault. The uppermost part of the section includes thick-bedded, gray to white limestones with rare pinkish secondary chert nodules (Figs. 23 A and 24).

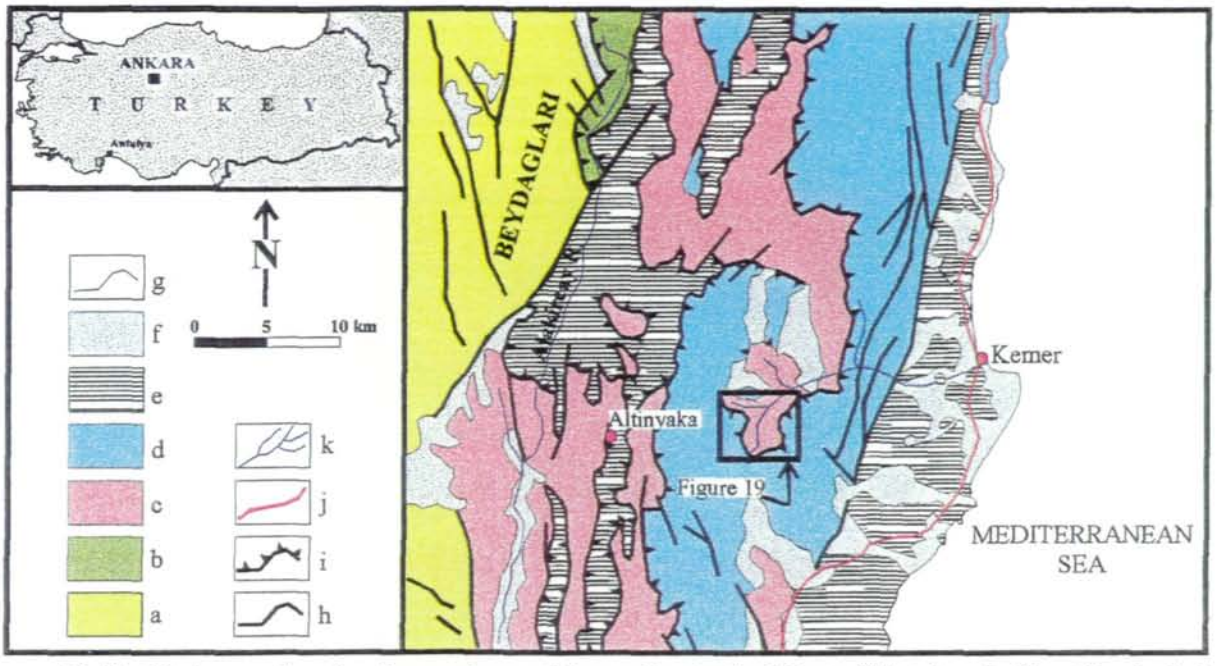


Figure 18. Detailed map showing the geology of the region to the West of Antalya Gulf. a. Beydaglari Autochthon. b-e. Antalya Nappes; b. Cataltepe Nappe, c. Alakircay Nappe, d. Tahtalidag Nappe, e. Tekirova Ophiolitic Nappe, f. Post-Eocene cover rocks, g. Normal contact, h. Fault, I. Overthrust, J. Main roads, k. Drainage system (after Senel, 1997a, b, c).

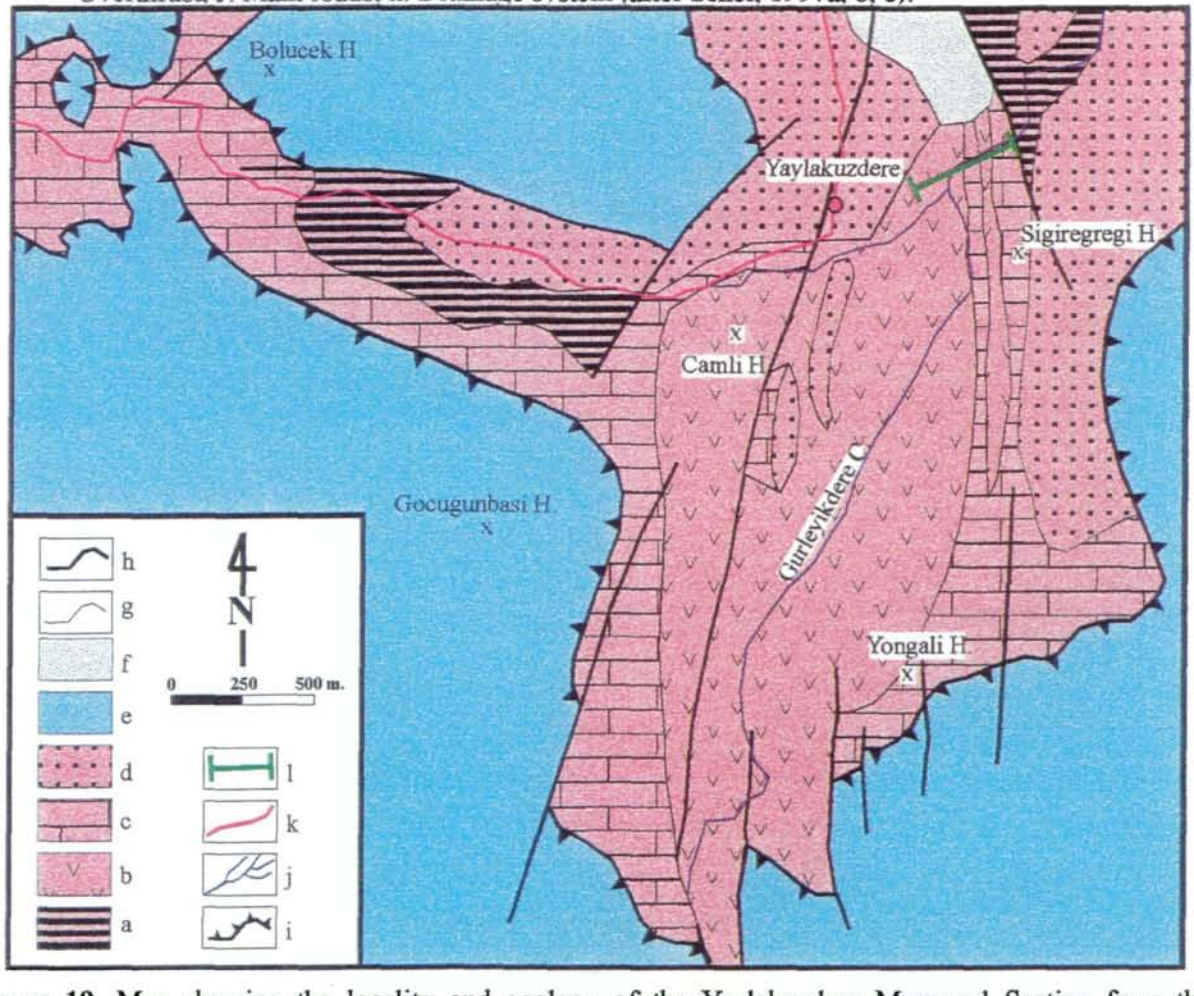
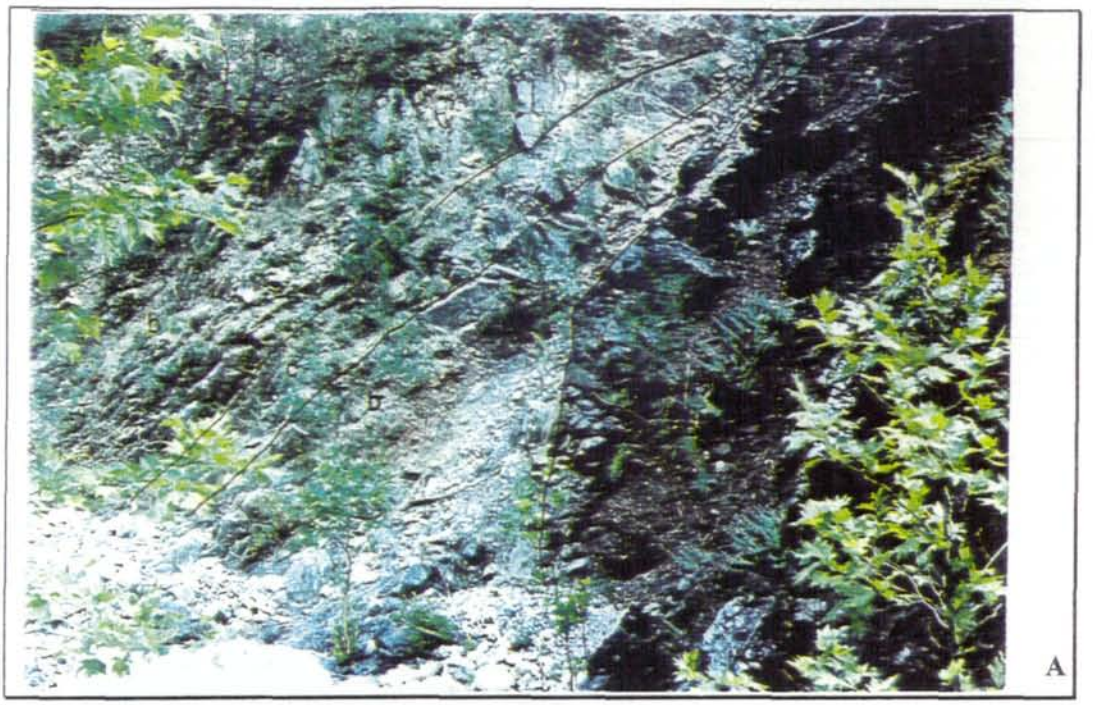


Figure 19. Map showing the locality and geology of the Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes and its vicinity. a-d. Alakircay Nappe; a. Tesbihli Formation (mainly bedded chert), b. Karadere Formation (mainly pillow lava), c. Gokdere Formation (mainly pelagic limestone), d. Candir Formation (mainly claystone-sandstone and pebbles), e. Tahtalidag Nappe, f. Post-Eocene cover rocks, g. Normal contact, h. Fault, i. Overthrust, j. Drainage system, k. Main roads, l. Location of the Yaylakuzdere Measured



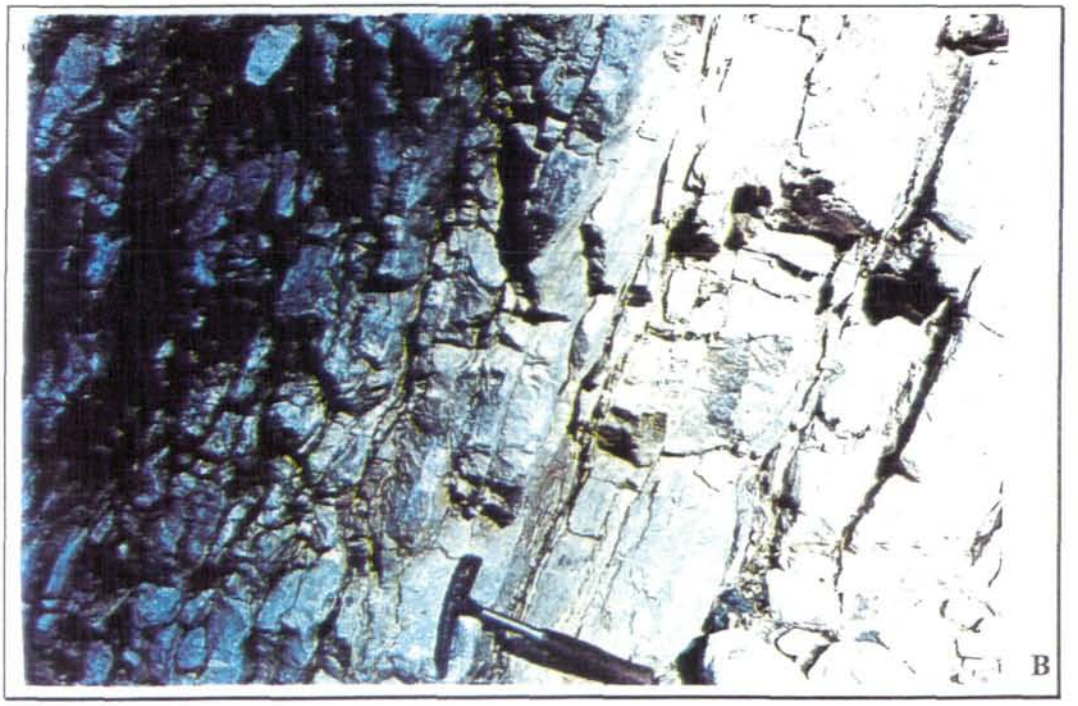


Figure 20 A. General view of the Yaylakuzdere Measured Section 1 showing the contact between Karadere and Gokdere Formations. View towards the northeast. a. Karadere Formation, mainly ocean floor basalts, older than latest Carnian, b. Latest Carnian-early Norian Gokdere Formation, mainly with an alternation of the thin to medium bedded pelagic limestones and shales, c. Volcanic sill in the Gokdere Formation.

B. Detail view of the upper part of the Gokdere Formation in Yaylakuzdere Measured Section 2 showing black chert nodules within thin to thick-bedded limestone and shale breaks.

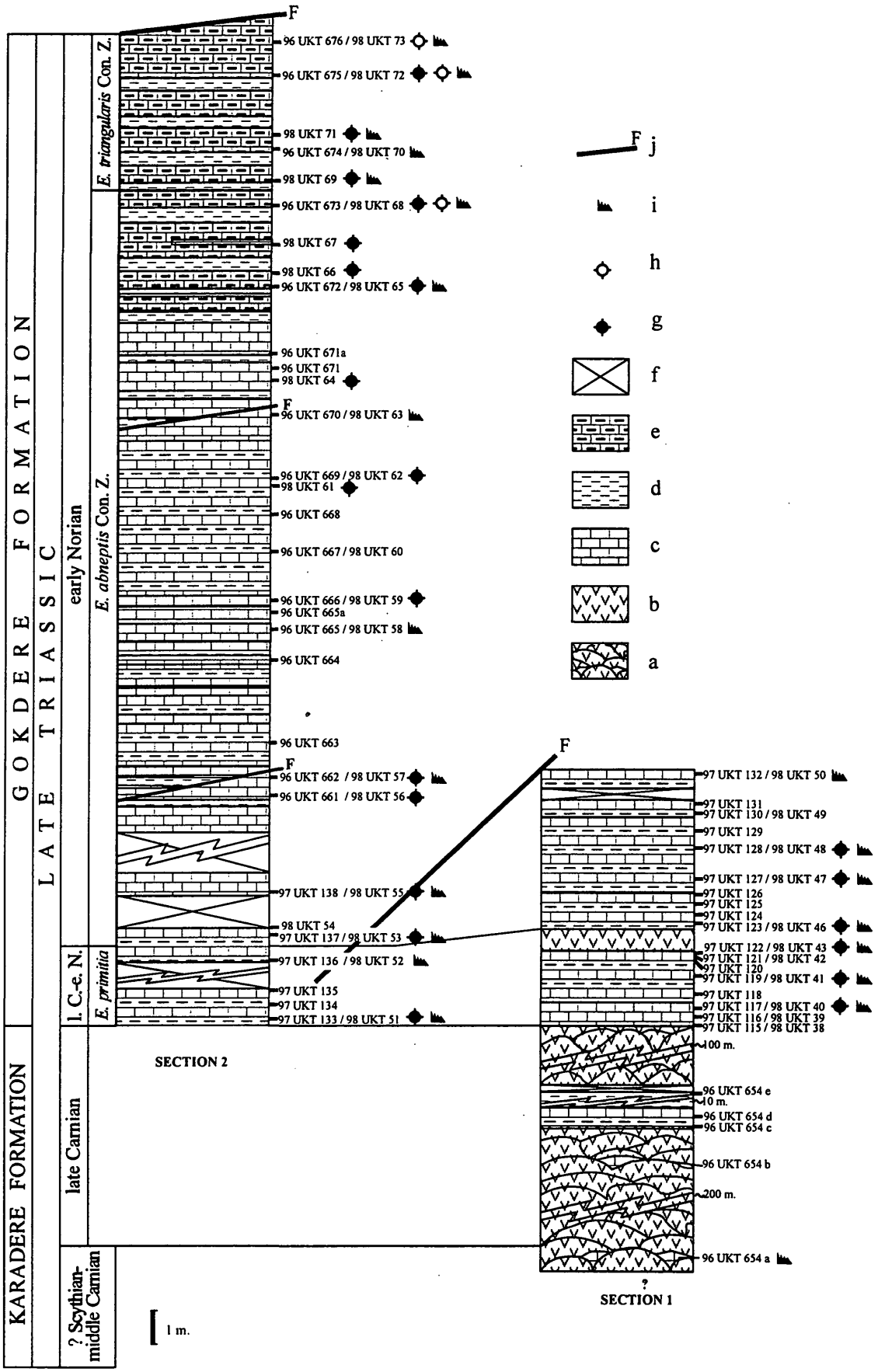


Figure 21. Columnar section of the Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes with locations of radiolaria and/or conodont bearing samples, a. Limestone layer in pillow lava, b. Volcanic sill, c. Limestone, d. Shale, e. Cherty limestone, f. Covered interval, g. Pyritized radiolaria, h. Normal radiolaria, i. Conodonts, j. Fault. Abbreviation: l.C.-e.N.: latest Carnian-earliest Norian.

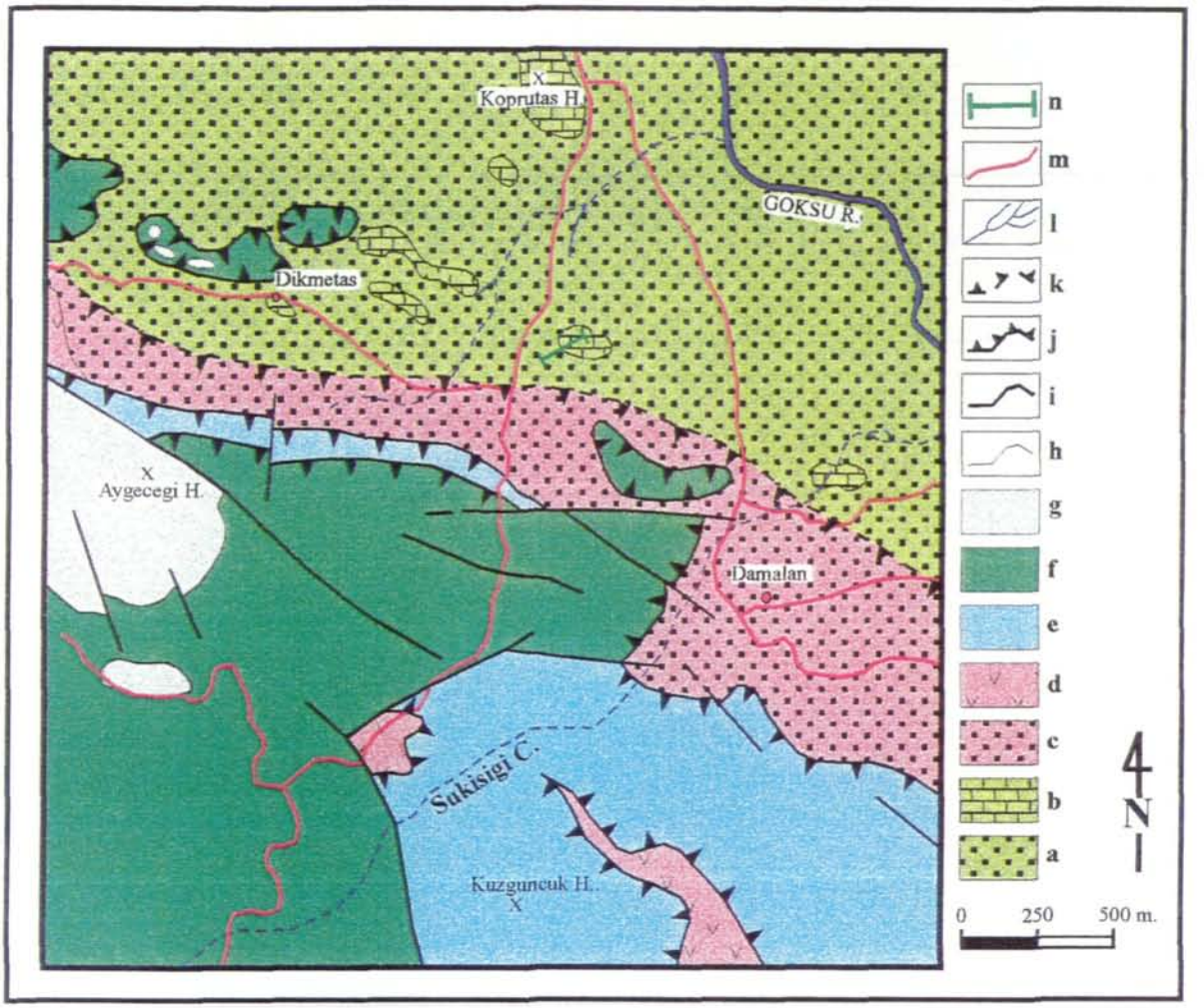
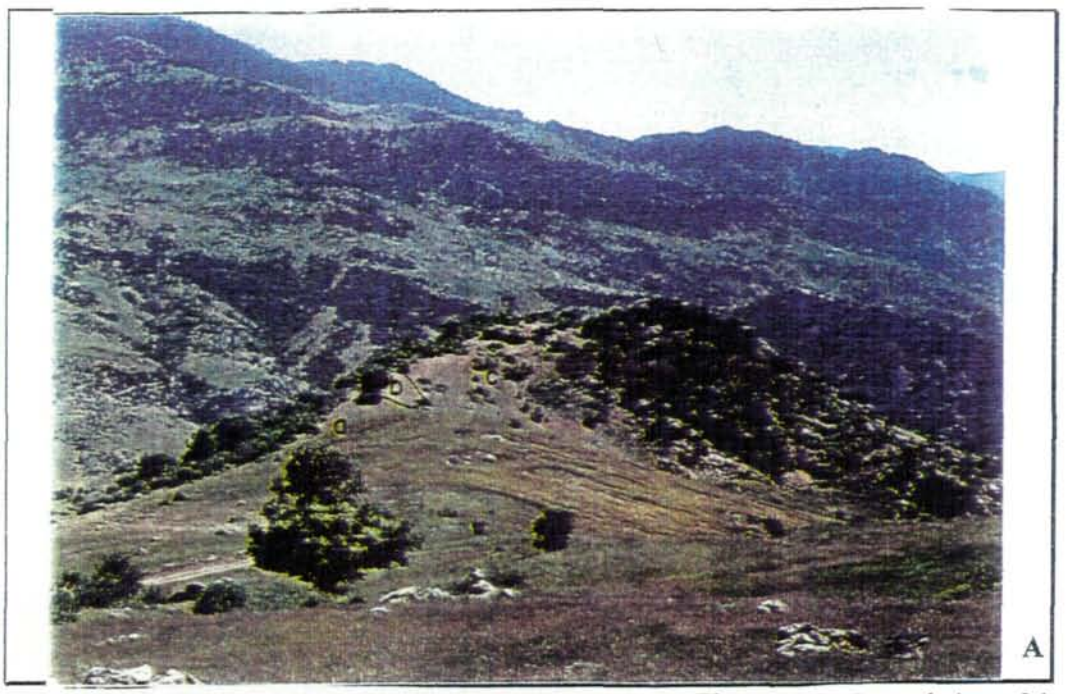


Figure 22. The location and the geology of the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes and its vicinity. a-b: Cataltepe Nappe of the Antalya Nappes; a. Kasimlar Formation (mainly sandstone and shale), b. Kayabuku Formation (mainly calciturbidite, chert, cherty limestone and limestone), c-d: Alakircay Nappe of the Antalya Nappes; c. Candir Formation (mainly sandstone and shale), d. Karadere Formation (mainly pillow lava-basic volcanics), e. Tahtalidag Nappe of the Antalya Nappes; f. Alanya Nappe, g. Cover rocks mainly Eocene, h. Normal contact, i. Fault, j. Overthrust, k. Probable overthrust, l. Drainage system, m. Main roads, n. Location of Dikmetas Measured Section (after Sonmez, 1995).



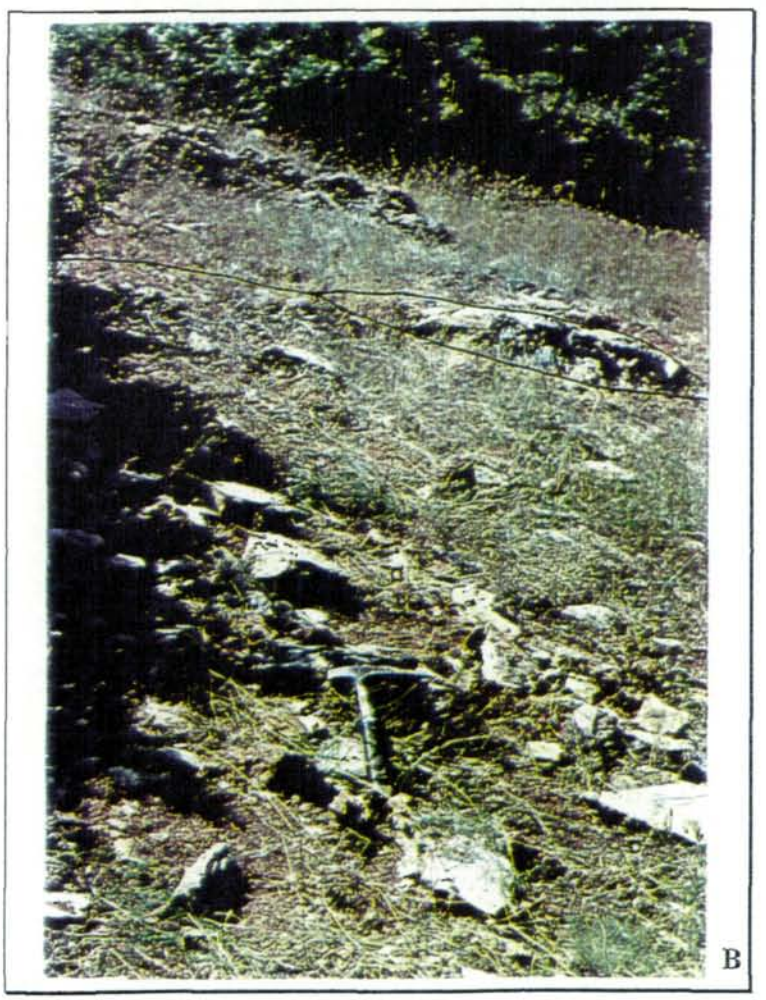


Figure 23 A. General view of the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes. View towards the northeast. a. Late Norian Kasimlar Formation (an alternation of sandstones and shales with biohermal limestone intercalations), b. Covered interval, c. Lower part of the Rhaetian-Liassic Kayabuku Formation (mainly an alternation of thin to medium bedded beige cherty limestones and red cherts with calciturbidite levels at the base, thin to medium bedded pinkish limestone with occasional chert nodules at the middle and an alternation of green cherts and thin-bedded limestones at the top), d. Liassic thick bedded gray-beige limestones with rare pinkish chert nodules of the Kayabuku Formation.

Figure B. Photograph showing the Rhaetian-Hettengian boundary in Kayabuku Formation in the Dikmetas Measured Section, a. Alternation of Rhaetian thin to medium bedded red cherts and gray-beige limestones, b. Calciturbidite level, c. Liassic thin to medium bedded pinkish limestone with occasional chert nodules.

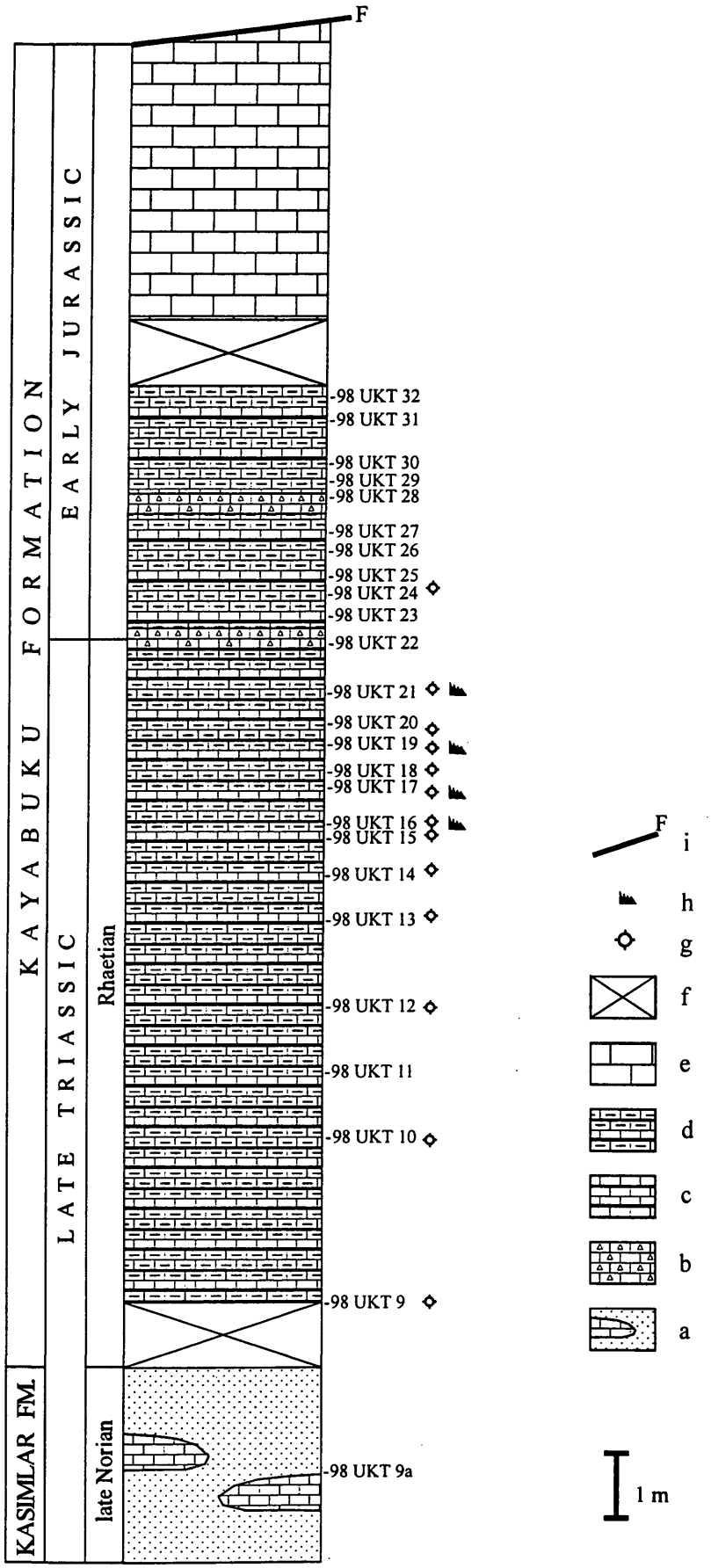


Figure 24. Columnar section of the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, showing the locations of radiolaria and/or conodont bearing samples, a. Alternation of the sandstones and shales with biohermal limestone interbeds, b. Calciturbidites, c. Limestone with chert bands, d. Limestone with chert nodules, e. Limestone, f. Covered interval, g. Radiolaria, h. Conodonts, i. Fault.

4. BIOSTRATIGRAPHY

In this study, very rich radiolarian fauna from four different sections and one individual sample have been provided. Although the fauna are rich and diverse, author avoid establishing radiolarian zonation because of extensive tectonic affects.

Some of the measured sections (the Yaylakuzdere and the Dikmetas) yielded a rich conodont fauna that could help to correlate radiolarian fauna. The conodont fauna was partly described by M. Sc. Asuman KESKIN, M.T.A, Turkey but mainly by Dr. Heinz W. KOZUR, Budapest, Hungary. Only at the upper part of the Huglu Tuffites from Huglu Unit of the Beysehir-Hoyran Nappe, some remains of Ammonites were found.

4. 1. Description and Comparison of the Radiolarian Assemblages

4. 1. 1. The Sugozu Measured Section

Very rich late Ladinian- early Carnain radiolarian assemblages have been recovered from the Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes (Fig. 25). Although the measured section is highly tectonized, the section is well dated by using radiolarian data. It comprises two parts as section 1 and 2.

The radiolarian fauna of the Sugozu Measured Section have close resemblance and is well correlative to the zonation proposed by Kozur & Mostler (1994, 1996b; Fig. 26 A).

At the base of the Sugozu Measured Section 1, *Muelleritortis cochleata* (NAKASEKO & NISHIMURA) is abundant together with *Pseudostylosphaera goestlingensis* (KOZUR & MOSTLER), *Pseudostylosphaera nazarovi* (KOZUR & MOSTLER, *Poulpus curvispinus cuvispinus* DUMITRICA, KOZUR & MOSTLER, *Silicarmiger latus latus* KOZUR & MOSTLER, *Annulotriassocampe sulovensis* (KOZUR & MOCK), *Triassocampe scalaris* DUMITRICA, KOZUR & MOSTLER s. l., *Castrum perornatum* BLOME, *Multimonilis* sp. A (Figs. 25 and 27). Absence of *Muelleritortis firma* (GORICAN) indicates the base of late Ladinian is not present in the section. The characteristic zone fossil (*Pterospongus priscus* KOZUR & MOSTLER) for the basal part of the *Muelleritortis cochleata* Zone could not be found within this level. This level possibly corresponds to the *Pterospongus priscus* Subzone of the *Muelleritortis cochleata* Zone due to location of this level very close to the base of the *S. rarauana* Subzone and the absence of the *Muelleritortis firma* (GORICAN).

30 cm above the base of the Sugozu Measured Section 1, first *Spongoserrula rarauana* DUMITRICA appears in the sample 96-UKT-523 together with abundant species of genus *Muelleritortis* and species of family Oertlispongidae. Base of the *Spongoserrula rarauana* Subzone of *Muelleritortis cochleata* Zone is also important to be the First Appearance Datum (FAD) of many taxa as *Spongoserrula bidentata* KOZUR & MOSTLER, *Spongoserrula rarauana trinodosa* KOZUR & MOSTLER, *Spongoserrula semicircularis* KOZUR & MOSTLER, *Bulbocyritium dryites* SUGIYAMA, *Orbiculiforma gazipasaensis* n. sp., *Canoptum levis* n. sp., *Pseudostylosphaera gracilis* KOZUR & MOCK, *Corum sugozuensis* n. sp., *Corum kraineri* n. sp., *Orbiculiforma karnica* (KOZUR & MOSTLER), *Karnospongella bispinosa* KOZUR & MOSTLER, *Annulotriassocampe baldii* KOZUR, *Spongostylus tortilis* KOZUR & MOSTLER. Surprisingly, the *Spongoserrula rarauana* Subzone of *Muelleritortis cochleata* Zone is represented by short interval in the Sugozu Measured Section 1 (Fig. 25).

The *Spongoserrula fluegeli* Subzone of *Muelleritortis cochleata* Zone is characterized by a very abundant species of genus *Muelleritortis* and species of family Oertlispongidae in both Sugozu Measured Section 1 and 2. Some of the forms are only present within this subzone as *Spongoserrula bifurcata bifurcata* KOZUR & MOSTLER, *Scutispongus parvifoliatus parvifoliatus* KOZUR & MOSTLER, *Hungarosaturnalis pileatus* (NAKASEKO & NISHIMURA), *Cryptostephanidium goncuoglui* n. sp., *Hinedorcus gibber* n. sp., *Scutispongus latus*

	MIDDLE TRIASSIC																		LATE TRIASSIC																									
	late Ladinian																		early Carnian																									
	M. cochleata Rad. Z.																		*T. kretaensis* Rad. Z.																			Unnamed							
	?P.p.			*S.r.*		*S. fluegeli* Rad. Subzone																																						
	SECTION 1													SECTION 2																														
R: 1-2 specimens, **C: 3-5 specimens,** **A: >5 specimens**	96-UKT-520	96-UKT-521	96-UKT-522	96-UKT-524	96-UKT-525	96-UKT-526	96-UKT-527	96-UKT-528	96-UKT-529	96-UKT-530	96-UKT-531	96-UKT-532/94-UKT-42	96-UKT-544/96-UKT-533	96-UKT-545	96-UKT-546	96-UKT-547	96-UKT-548	96-UKT-549	96-UKT-550	96-UKT-551	96-UKT-552	96-UKT-553	96-UKT-555	96-UKT-556	96-UKT-558	96-UKT-559	96-UKT-560	96-UKT-562	96-UKT-563	96-UKT-564	96-UKT-566	96-UKT-567/94-UKT-43	96-UKT-569	96-UKT-571	96-UKT-572	96-UKT-574	96-UKT-575	96-UKT-576	96-UKT-577	96-UKT-579	96-UKT-580	96-UKT-582	96-UKT-583	96-UKT-584
***Dumitricasphaera* sp. A**				R	R	C	C	R	R	R	C	R	C	C		R	R	R			R				R							R		R										
Spongostylus tortilis				R		R	C	R		R	C	R	R	R		R	R			R					R			R	R		R	R				R	R	R		C	A	A	C	A
***Vinassaspongus erendili* n. sp.**						R	C	C	R		R		R		R	C	C	A	A	A	R																							
Vinassaspongus subsphaericus						R	R		R	R	C	R	R	R	C	R		R	C	R													R	R	R						R	R	R	C
Paronaella claviformis								R			R	R	R	R	R		R	R																									R	C
Paronaella glaber								R	R			R	C	R			R																										R	R
P.* sp. aff. *P. nudum											R		R																															
Karnospongella bispinosa				R		R		C	R	R	R	R	R	R			R		C	R																							R	R
Paurinella acutispinosa		R	R	R		C	R	C	C	C	R	C	R	R																														
Paurinella latispinosa		R	R	C		R	R	C	C	R	R	R	C	R	R	R		R	R	R																								
F. falciformis* sp. aff. *F. minor											R																																	
Pterospongus patrulii		R																																										
Scutispongus latus								R			R		C	R			R	R																										
S. ? parvifoliatus parvifoliatus						C	R	R		R	C		C	R																														
S. ploechingeri ploechingeri						R		R	R	C	R	C	A	A	C	R	R																											
S. rostratus rostratus					R		C	R																																				
Scutispongus tortilispinus										R			R	A	C		R																											
Scutispongus undulatus												R	C	R	R																													
Spongoserrula bidentata					R	R	R	R	R		R	R	R	R	C																													
Sp. bifurcata bifurcata								R																																				
Sp. fluegeli fluegeli						R	R	R	R		R	R		R				R																										
Sp. rarauana rarauana				C	A	A	C	A	A	A	A	A	A	A	C	R	R		R	R																								
Sp. rarauana trinodosa					R		R	R	R		R	R	R	R	R	R																												
Sp. semicircularis				R	R	R	R	R				R	R	R																														
St. asymmetricus triangulodentatus													R	A	R	R	R																											
St. subsymmetricus latopediculus									R	R	R		R																															
St. subsymmetricus subsymmetricus						R	R	R					C	A	R	C	C																											
***Palaeosaturnalis* spp.**																				R		R				C		C			R			C	C		R	R		C	C	A	C	C
***Orbiculiforma gazipasaensis* n. sp.**				R		R											R	R	R	R	R										R	R												
Orbiculiforma goestlingensis																									R	C											R			R	C	C	C	
Orbiculiforma karnica					R		C	A	R	R	R	C	C	R	C	R	C	C	C	C	R	R											R	R										
***Pseudogodia sonmezi* n. gen. n. sp.**						R	R		R				C	R	R		R								R																			
Pentaspongodiscus crosi			R		C	C	C	R	R	R	C	R	C	R	R	R	R	R																										
***Pentaspongodiscus discoides* n. sp.**			C	C	C	A	R	C	A	C	R	C	A	C	R	R																												
Pentaspongodiscus steigeri								C			R	R	C	R			R			R	R				R	C	R	R	C			R	C	R	C	C				R	R			
Hu. longobardica		R							R		R																																	
Hu. multispinosa				R			R	R			R		R	R																														
Hu. pileatus						R			R				R																															

Figure 25. Distribution and relative abundance of radiolaria in Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, based on the zonation proposed by Kozur and Mostler (1994, 1996b). Sample 96-UKT-533 in Section 1and 96-UKT-544 in Section 2 have same fauna. The amount of *M. cochleata* (NAKASEKO and NISHIMURA) and *T. kretaensis* (KOZUR and KRAHL) are equal in both these samples. Abbreviations: *P.p.*: *Pterospongus priscus* Rad. Subzone, *S.R.*: *Spongoserrula rarauana* Rad. Subzone.

	MIDDLE TRIASSIC																		LATE TRIASSIC																									
	late Ladinian																		early Carnian																									
	M. cochleata Rad. Z.																		*T. kretaensis* Rad. Z.																		Unnamed							
	?P.p.			S.r.		*S. fluegeli* Rad. Subzone																																						
	SECTION 1												SECTION 2																															
R: 1-2 specimens, C: 3-5 specimens, A: >5 specimens	96-UKT-520	96-UKT-521	96-UKT-522	96-UKT-524	96-UKT-525	96-UKT-526	96-UKT-527	96-UKT-528	96-UKT-529	96-UKT-530	96-UKT-531	96-UKT-532/94-UKT-42	96-UKT-544/96-UKT-533	96-UKT-545	96-UKT-546	96-UKT-547	96-UKT-548	96-UKT-549	96-UKT-550	96-UKT-551	96-UKT-552	96-UKT-553	96-UKT-555	96-UKT-556	96-UKT-558	96-UKT-559	96-UKT-560	96-UKT-562	96-UKT-563	96-UKT-564	96-UKT-566	96-UKT-567/94-UKT-43	96-UKT-569	96-UKT-571	96-UKT-572	96-UKT-574	96-UKT-575	96-UKT-576	96-UKT-577	96-UKT-579	96-UKT-580	96-UKT-582	96-UKT-583	96-UKT-584
Ornatisaturnalis ingridae						C	C			R	C		R																															
Or. quadrispinosus																				R																								
***Cryptostephanidium cornigerum*.**								R	R	R		R																																
Cr. goncuoglui n. sp.						R		C	C	R	R	R	C	R																														
Ps. coccostyla coccostyla							R																																					
Ps. goestlingensis	R	C	C	R	R	C	C	C	C	C	C	C	C	R	R		R		C	R	R											R	R	R										
Ps. gracilis				C	C	R	A	C	C	A	A	C	A	C	A	C	C		C	R	R					R					R	R	R							R	R	R	R	
Ps. imperspicua		R	R									R		R																														
Ps. longispinosa		R			R	R		R	R						R																													
Ps. nazorovi	A	C	A	R	R	A	C	A	C	A	A	A	C	A	A	C	C		C	R					R			R									R							
Muelleritortis bosniensis	R	R	R	R	R	R	A	C	A	C	A	R	R			R	R	R																										
Muelleritortis cive						R	C	R	C	C	C	A	R	C	C	A	C	C	C	R		R			C	C		R	C	R	R	R					R		R	R	R	C	C	R
M. cochleata cochleata	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	C	C	R	R	R																								
M. cochleata koeveskalensis	A	A	A	A	A	A	A	A	A	C	A	A	C	C	R	C	C	R	R	R	R																							
M. cochleata tumidospina	R	C	R	A	A	R	C	R	R	R	R	R	R	R			R																											
Muelleritortis expansa			R	R	R	C	A	R	R		R	C	C	C	C	R				R																								
Muelleritortis longispinosa			R	C	A	A	A	A	A	A	A	A	C	R																														
Pentatortis **sp. A**							R																																					
Tritortis ariana Group																	R	R	A	A	A	A	C	R	C	R	R	C	C	A	A	A	A	C	C	R								
Tritortis balatonica								R		R		R	R	R		R		R	R	R	C	C			R				R		R				R									
Tritortis kretaensis dispiralis						R	R	R	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	C	C	R	R	C	A	C	C	R	R	C	R	R								
T. kretaensis kretaensis												R	R	C	A	A	A	A	A	A	A	A	A	C	A	A	A	A	A	A	A	A	A	A	C	R								
Bulbocyritium dryites				R				R		C		R		R		R	R	R																										
Canoptum cucurbita							R	R	R	R	C	C	A	C	C	A	A	C	C	C	C		C	C	C	A	C	C	A	A	A	C		A	C	A	R	R	C	R	R	R		C
Canoptum inornatus n. sp.												R	R								R		R		C	C	R	R																
Canoptum levis n. sp.				R			R	C	C	C	A	C	A	A	C	C	C	C	R	R	C	R	C		C	C	C	R	R	C	R	A	R	C	A	C	R	R						
Hinedorcus gibber n. sp.						C					R		R	R																														
Sp. longobardica												C		R																														
Corum ? delgado																						R		R	A	A	C	C	R	R	R	R	R	C	C	R	R	R	R	C	C			
Corum kraineri n. sp.				R	R	R	C	R	C	R	C	A	A	C	C	C	C	C	R	R	C	C	R	R	C	C	R	R	R	C	C	R	R	C	C	C	C	R	R	R	A	R	R	C
Corum sugozuensis n. sp.				R		R	R	R	R	R	C	A	A	R	C	A	C	C	R	R	C	C	C	R	C	C	R	R	R	C	C	R	R	R	R	C	R	R	R	R	C	R	R	C
Hozmadia spinosa									R		R																																	
Po. curvispinus cuvispinus	R		R	R		R	R	R	R	R	R		R	R																														
Silicarmiger latus latus	A	C	C	R	R	C	R	R								R																												
Annulotriassocampe baldii **Group**				R	C	C	R	C	C	R	C	C	C	C	R	C	R	C	R	C	R	C	C	C	A	C	C	C	C	A	C	R	A	A	C	C	C	C	R	R	R	C	C	C
An. multisegmantatus n. sp.		R	C	C	R	C	C	C	R	C	C	C	A	A	C	A	C	C	C	C	R	R	R		C	A	A	C	R	R	R			R	R									
An. sulovensis	C	C	C	R	R	C	R	C	C	R	C	A	C	C	R	A	C	C	R	R	R	C	A	C	A	A	A	C	C	R	C	R	C	C	C	C	C	C	R	R	R	C	R	C
Triassocampe scalaris	A	A	R	R																																								
Castrum peromatum	R	C	C	C	R	R			R	R	R	R	R	R			R	R		R					R		R								R		R	R						
Multimonilis **sp. A**	R	R	R	R		R	R	C	R	R	C	C	C	C	C	C									R	C				R					R	R								
Multimonilis **sp. B**												R			R																													
Multimonilis **? sp. C**								R	R		R			R		R	R				R	R			C									R		R								

Figure 25. Continued.

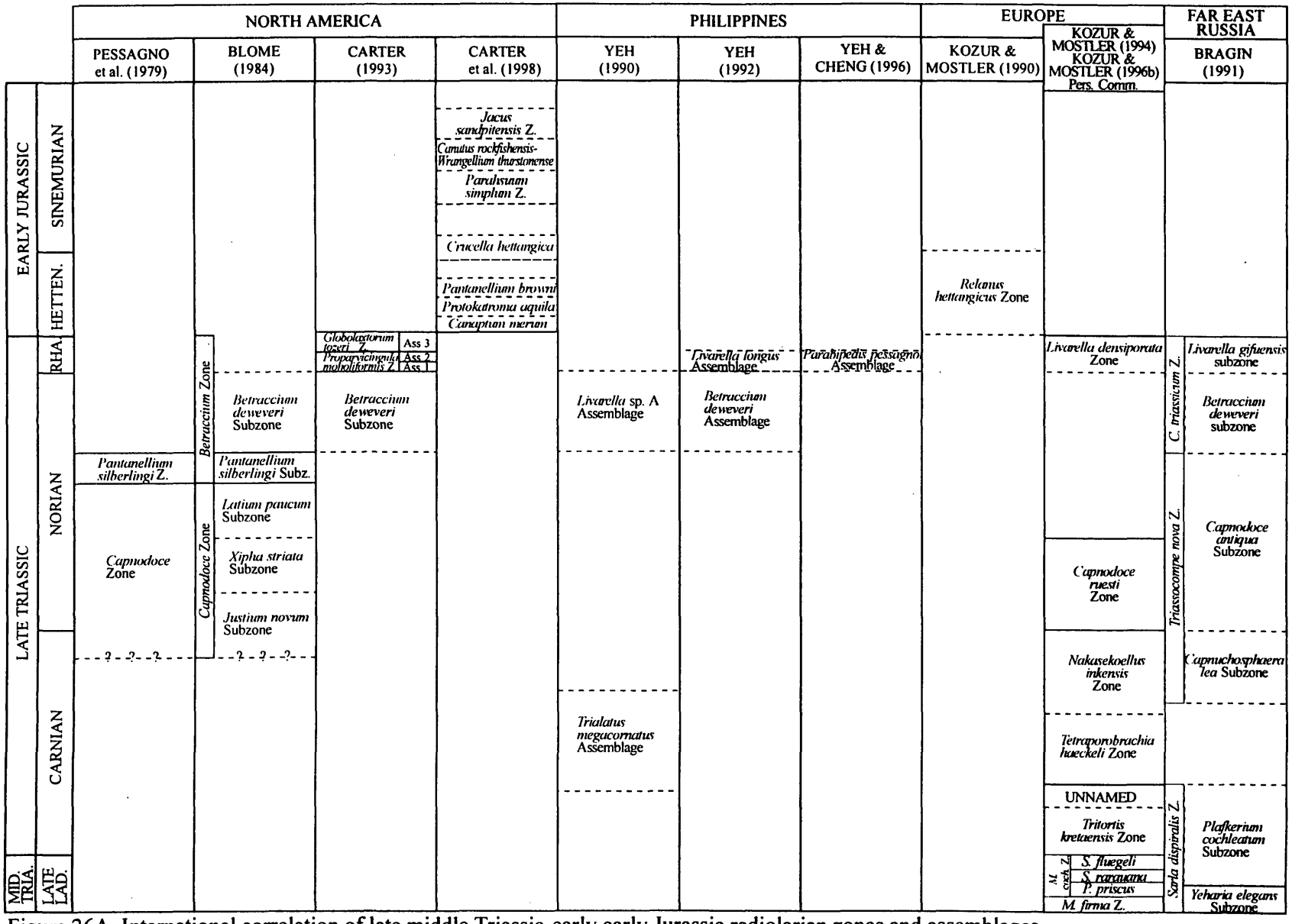


Figure 26A. International correlation of late middle Triassic-early early Jurassic radiolarian zones and assemblages.

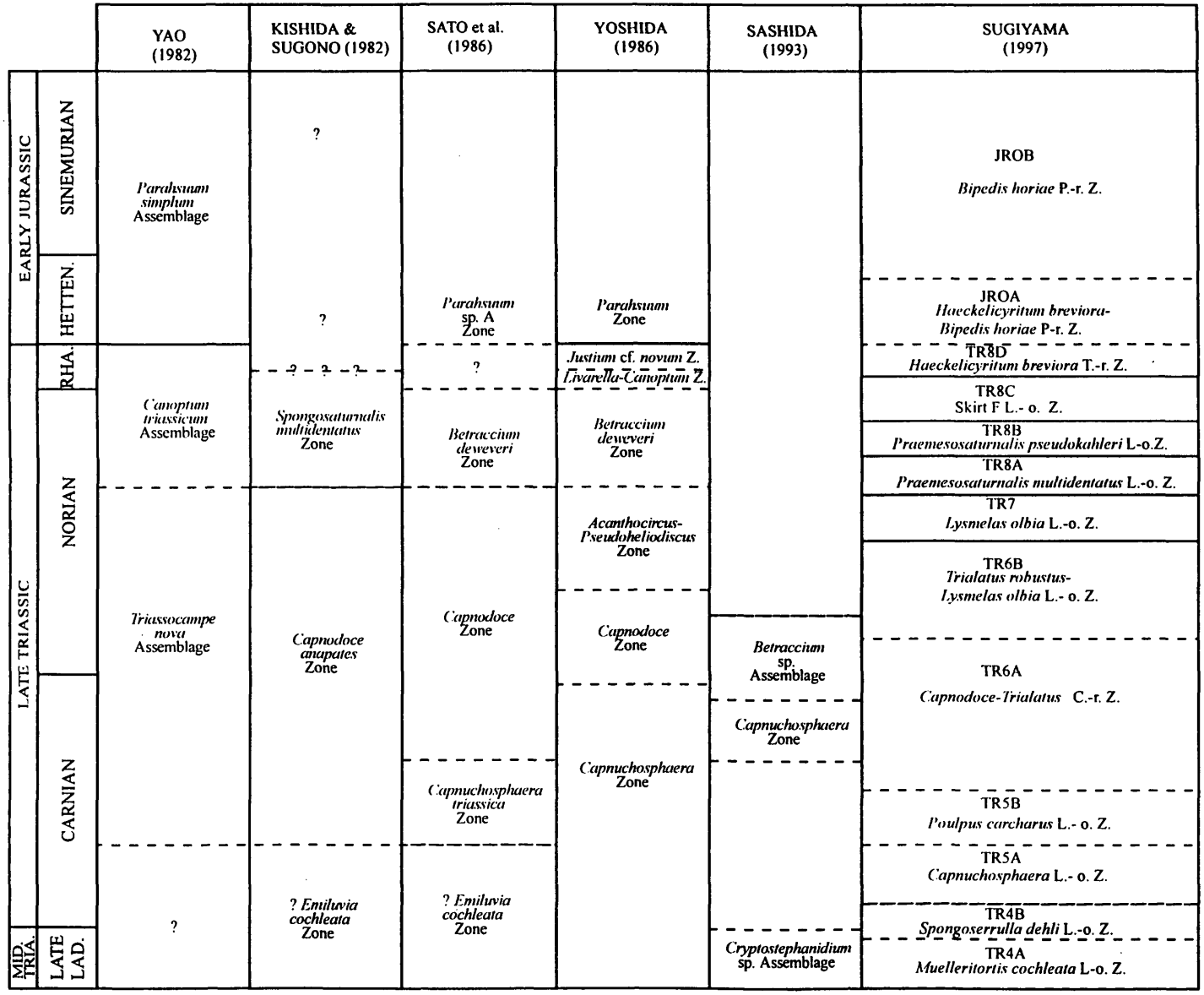


Figure 26B. Correlation of late middle Triassic-early early Jurassic radiolarian zones and assemblages in Japan.

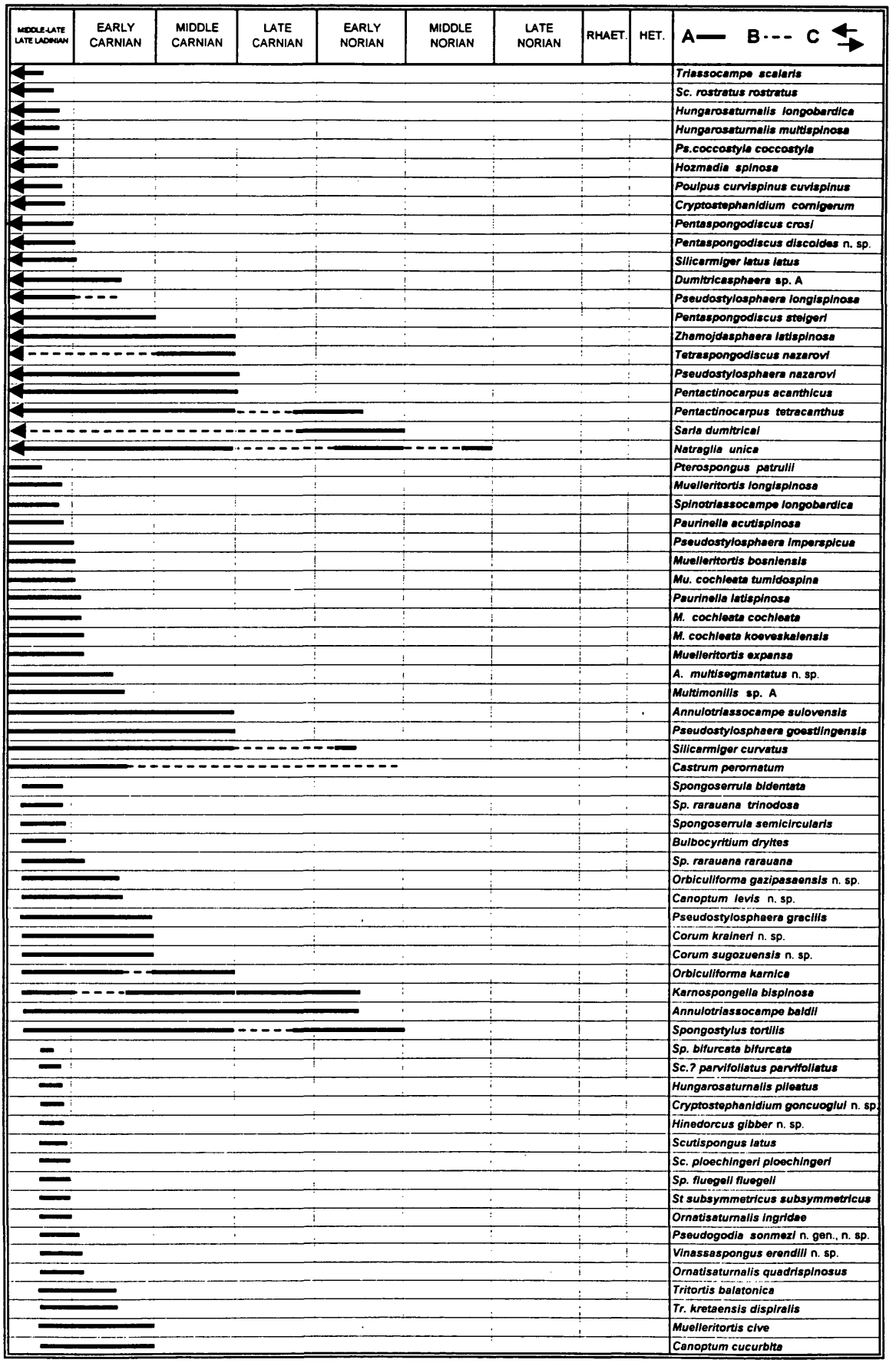


Figure 27 Total stratigraphic distribution of 332 Triassic and 4 early Jurassic radiolarian taxa in this study together with published data. A. Definite occurrence of the taxon, B. Possible occurrence of the taxon, C. Occurrence of the taxon extending into higher and lower stratigraphic units.

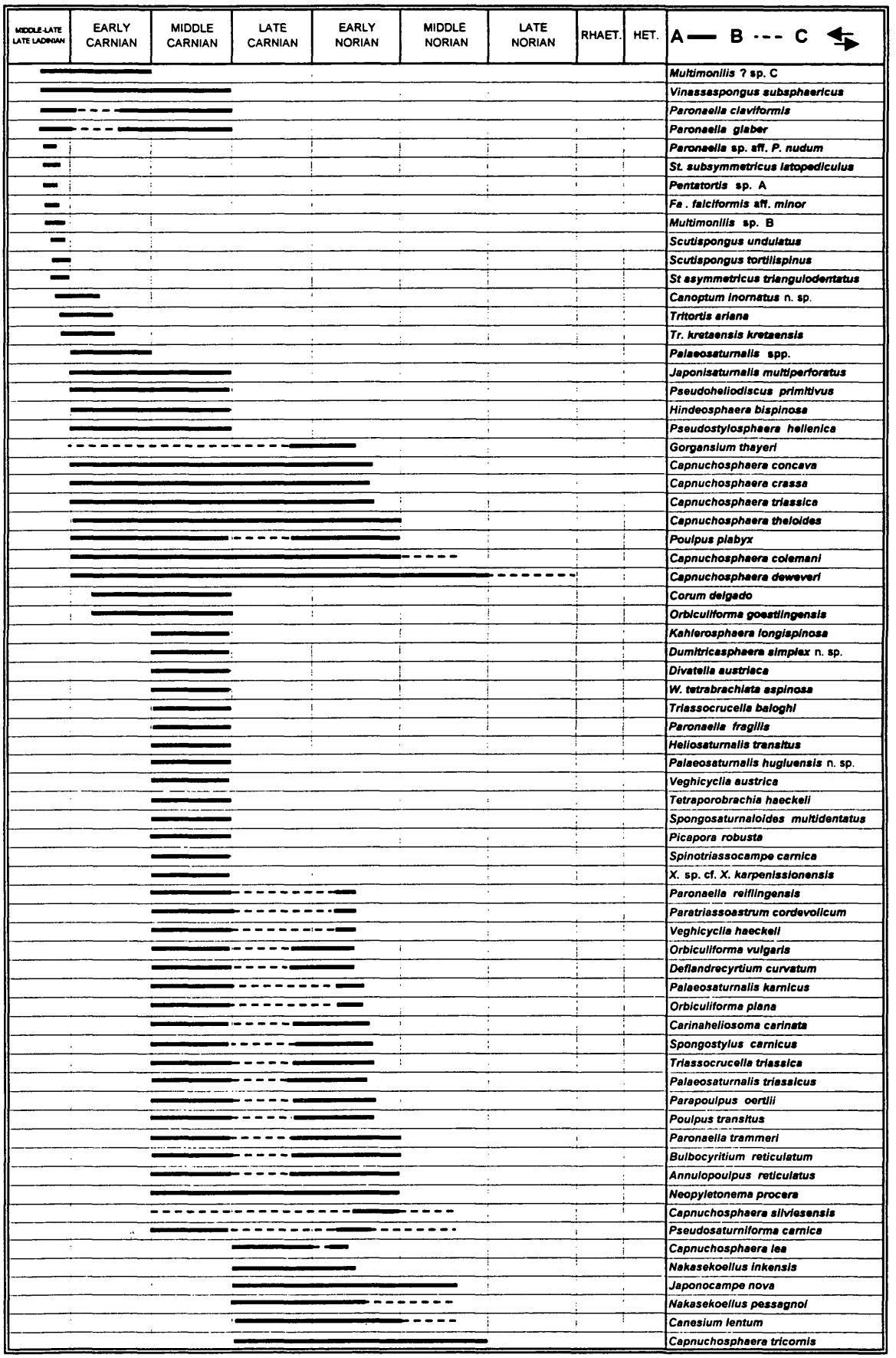


Figure 27 Continued.

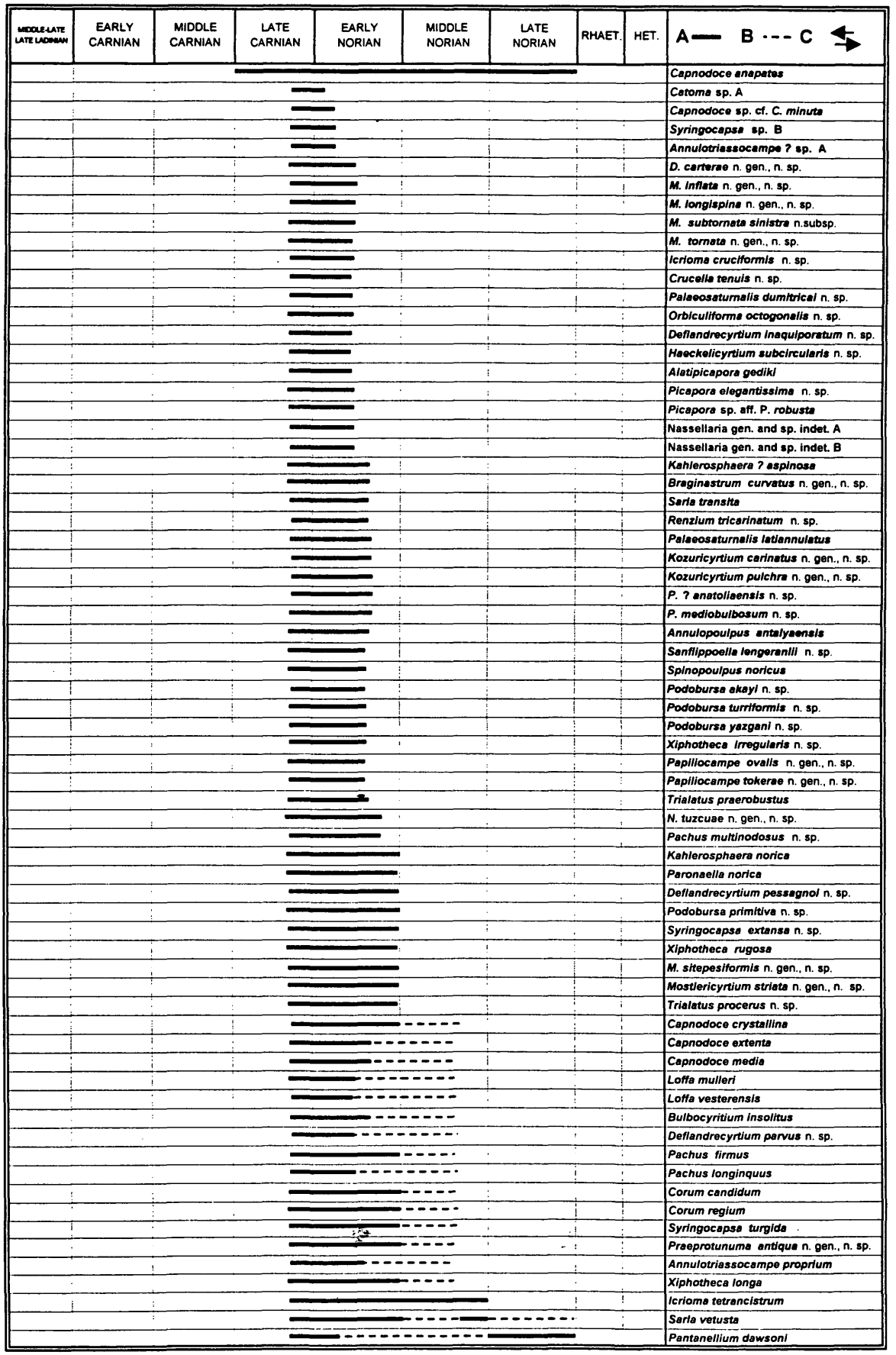


Figure 27 Continued.

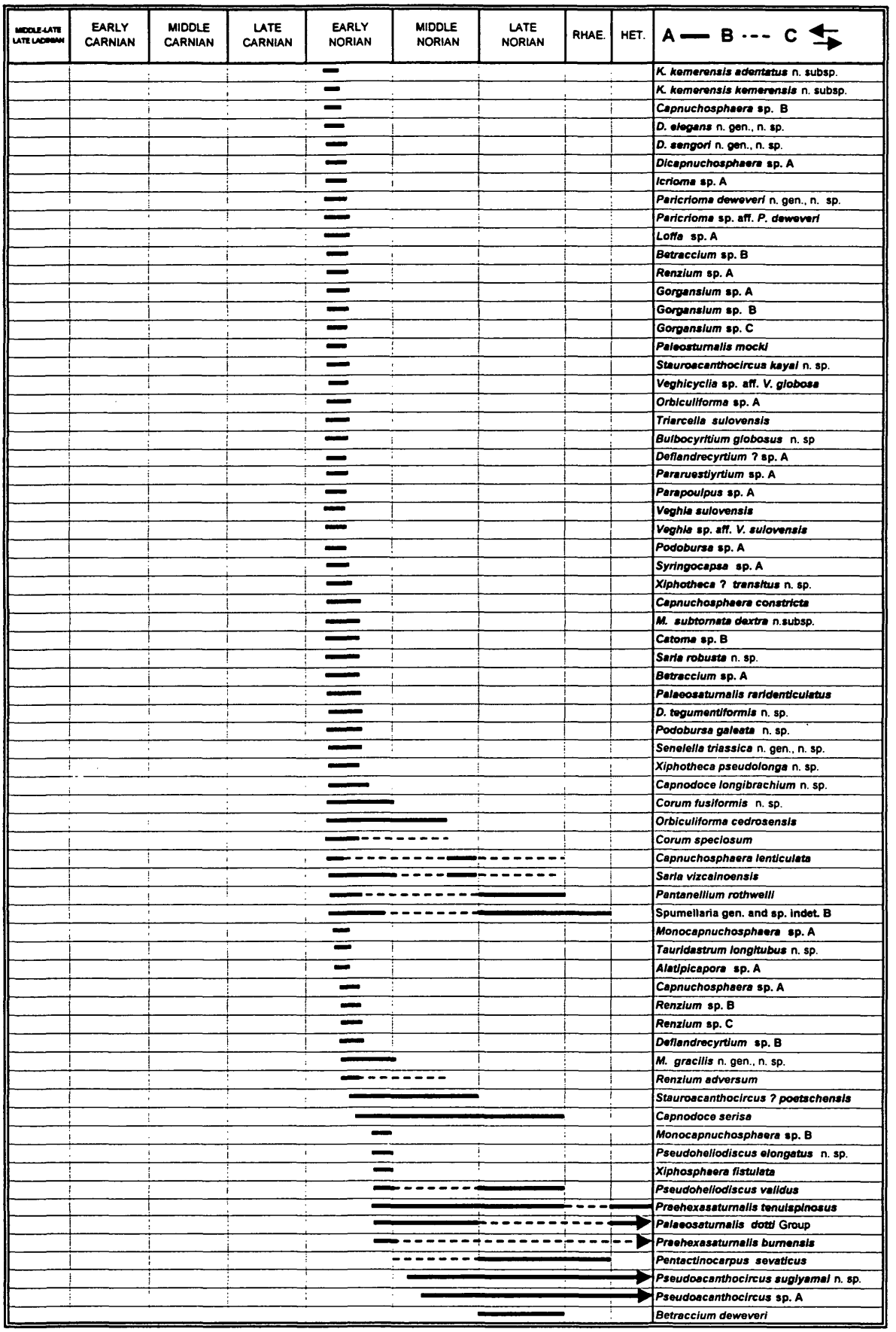


Figure 27 Continued.

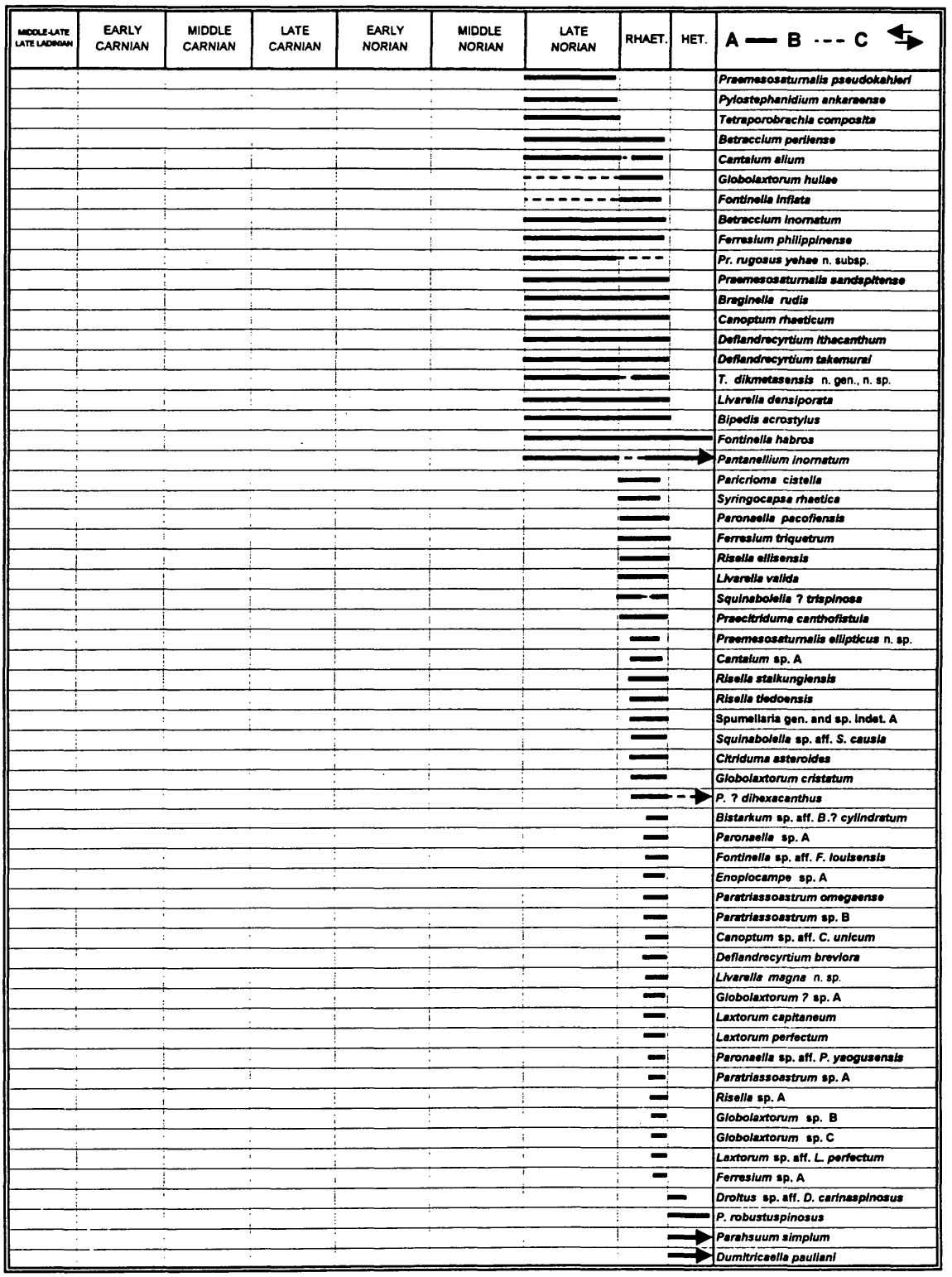


Figure 27 Continued.

KOZUR & MOSTLER, *Steigerispongus subsymmetricus latopediculus* KOZUR & MOSTLER, *Pentatortis* sp. A, *Multimonilis* sp. B, *Scutispongus undulatus* (DUMITRICA). *Tritortis kretaensis dispiralis* (BRAGIN) also for first time appear at the base of this subzone while *Tritortis kretaensis kretaensis* (KOZUR & KRAHL) only appear at the middle part of this subzone, which is different from the Kozur & Mostler's (1994) suggestion.

Clear dominance of the *Tritortis kretaensis* (KOZUR & KRAHL) against *Muelleritortis cochleata* (NAKASEKO & NISHIMURA) could be seen for the first time at sample 96-UKT-539 in Sugozu Measured Section 1 and sample 96-UKT-550 in Sugozu Measured Section 2. It indicates the Ladinian-Carnian boundary according to Kozur & Mostler (1994; Fig. 26.A). This level is also the Last Appearance Datum (LAD) for many species as *Pentaspongodiscus crosi* KELLICI & DEWEVER, *Pentaspongodiscus discoides* n. sp., *Silicarmiger latus latus* KOZUR & MOSTLER, *Muelleritortis bosniensis* KOZUR & MOSTLER, *Muelleritortis cochleata tumidospina* KOZUR, *Scutispongus ploechingeri ploechingeri* KOZUR & MOSTLER, *Spongoserrula fluegeli fluegeli* KOZUR & MOSTLER, *Steigerispongus subsymmetricus subsymmetricus* KOZUR & MOSTLER, *Ornatisaturnalis ingridae* MOSTLER & KRAINER, *Scutispongus tortilispinus* KOZUR & MOSTLER and *Steigerispongus asymmetricus triangulodentatus* KOZUR & MOSTLER (Figs. 25 and 27).

Although, the Sugozu Measured Section 1 includes only the basal part of the *Tritortis kretaensis* Zone, this zone is completely present in Sugozu Measured Section 2. Mainly species of genus *Muelleritortis* except *Muelleritortis cive* SUGIYAMA disappear close the base of *Tritortis kretaensis* Zone together with *Paurinella latispinosa* KOZUR & MOSTLER, *Spongoserrula rarauana rarauana* DUMITRICA, *Pseudogodia sonmezi* n. gen., n. sp., *Vinassaspongus erendili* n. sp., *Ornatisaturnalis quadrispinosus* MOSTLER & KRAINER. For the first time, primitive *Palaeosaturnalis* appear very close the base of the *Tritortis kretaensis* Zone.

Disappearance of the *Tritortis kretaensis* (KOZUR & KRAHL) is rather abrupt in the Sugozu Measured Section 2 possibly related to small fault. This boundary is also the LAD for some taxa as *Dumitricasphaera* sp. A, *Annulotriassocampe multisegmantatus* n. sp., *Multimonilis* sp. A, *Tritortis balatonica* KOZUR, *Tritortis ariana* (CORDEY et al.) (Figs. 25 and 27).

According to Kozur & Mostler (1994, p. 166), one more zone could be present between the *Tritortis kretaensis* Zone and *Tetraporobrachia haeckeli* Zone (Fig. 26 A). Fauna from the Sugozu Measured Section 2 also reveals that one more zone is present between these two zones. This part is mainly characterized by abundant Nassellaria as *Canoptum cucurbita* (SUGIYAMA), *Corum ? delgado* SUGIYAMA, *Corum sugozuensis* n. sp., *Corum kraineri* n. sp., *Annulotriassocampe baldii* KOZUR Group, *Annulotriassocampe sulovensis* (KOZUR & MOCK) and some Spumellaria as *Spongostylus tortilis* KOZUR & MOSTLER, *Vinassaspongus subsphaericus* KOZUR & MOSTLER, *Paronaella claviformis* (KOZUR & MOSTLER), *Paronaella glaber* KOZUR & MOSTLER), *Karnospongella bispinosa* KOZUR & MOSTLER, *Palaeosaturnalis* spp., *Orbiculiforma goestlingensis* (KOZUR & MOSTLER), *Pseudostylosphaera gracilis* KOZUR & MOCK and *Muelleritortis cive* SUGIYAMA (Figs. 25 and 27).

Upper part of the Sugozu Measured Section 2 is most possibly as young as early Carnian due to absence of *Tetraporobrachia haeckeli* KOZUR & MOSTLER (zone fossil for middle Carnian) and associated fauna.

4. 1. 2. The Haciyunuslar Measured Section

In previous studies, the Huglu Tuffites were known to be Anisian-Ladinian in age based on the age determinations from the benthic foraminifera obtained from limestone blocks (Monod, 1977; Gokdeniz, 1981; Ozgul, 1997). In this study, radiolarian assemblages obtained from the limestone intercalations at the base of

the Huglu Tuffites clearly indicate the middle Carnian age.

The radiolarian fauna of middle Carnian is well-known and studied from Gostling and Grosreifling, in Austria (Kozur & Mostler, 1972, 1978, 1979, 1981). Moderately preserved but diverse radiolarian fauna from the base of Huglu Tuffites of Huglu Unit indicate *Tetraporobrachia haeckeli* Zone due to presence of index-species (Kozur & Mostler, 1994; Fig. 26.A). Also *Kahlerosphaera longispinosa* KOZUR & MOSTLER, *Dumitricasphaera simplex* n. sp., *Divatella austriaca* KOZUR & MOSTLER, *Weverella tetrabrachiata aspinosa* KOZUR & MOSTLER, *Triassocrucella baloghi* (KOZUR & MOSTLER), *Paronaella fragilis* (KOZUR & MOSTLER), *Heliosaturnalis transitus* KOZUR & MOSTLER, *Palaeosaturnalis hugluensis* n. sp., *Veghicyclia austrica* KOZUR & MOSTLER, *Spongosaturnaloides multidentatus* KOZUR & MOSTLER, *Picapora robusta* KOZUR & MOSTLER and *Spinotriassocampe carnica* KOZUR & MOSTLER are present together with *Tetraporobrachia haeckeli* KOZUR & MOSTLER only in middle Carnian (Figs. 27 and 28.A).

Due to high calcification, no Radiolarians are obtained from the upper part of the Huglu Tuffites in Haciyunuslar Measured Section. But conodonts (*Paragondolella polygnatiformis noah* (MOSHER) and *Gladigondolella* sp.) from one of the limestone intercalations very close to top of the Huglu Tuffites also indicate middle Carnian age (Fig. 28. A; Kozur, Personal Communication).

4. 1. 3. The Yaylakuzdere Measured Section

Although the Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes is affected by many faults, radiolarian data are well correlated and fixed by using abundant conodont data. At the base of the Yaylakuzdere Measured Section 1, conodont (*Gladigondolella* sp.) data obtained from limestone layer within pillow lava indicate the Scythian-middle Carnian age.

While Yaylakuzdere Measured Section 1 contains two conodont zones as the *Epigondolella primitia* (latest Carnian/earliest Norian) and the *Epigondolella abneptis* (early Norian), the Yaylakuzdere Measured Section 2 has also the *Epigondolella triangularis* Conodont Zone (upper part of early Norian) in addition to these two zones in Gokdere Formation (Figs. 29 and 30).

The radiolarian fauna of the *Epigondolella primitia* Conodont Zone in the Yaylakuzdere Measured Section is characterized by the clear dominance of the species of genus *Capnodoce* especially *Capnodoce media* BLOME and *Capnodoce extenta* BLOME. Many radiolarian taxa from the *Epigondolella primitia* Conodont Zone are also present in the *Epigondolella abneptis* Conodont Zone with rare exceptions as *Catoma* sp. A , *Capnodoce* sp. cf. *C. minuta* YEH, *Syringocapsa* sp. B and *Annulotriassocampe* ? sp. A (Figs. 27 and 29).

The radiolarian fauna of the *Epigondolella abneptis* Conodont Zone (early Norian) in the Yaylakuzdere Measured Section is very rich. Many radiolarian taxa are only restricted within this zone, some of the characteristics ones are *Kahlerosphaera kemerensis adentatus* n. sp., n. subsp., *Kahlerosphaera kemerensis kemerensis* n. sp., n. subsp., *Dicapnuchosphaera elegans* n. gen., n. sp., *Dicapnuchosphaera sengori* n. gen., n. sp., *Paricrioma deweveri* n. gen., n. sp., *Palaeosaturnalis mocki* KOZUR & MOSTLER, *Triarcella sulovensis* KOZUR & MOCK, *Bulbocyritium globosus* n. sp., *Veghia sulovensis* KOZUR & MOCK, *Xiphotheca* ? *transitus* n. sp., *Capnuchosphaera constricta* (KOZUR & MOCK), *Monocapnuchosphaera subtornata dextra* n. gen., n. sp., n. subsp., *Sarla robusta* n. sp., *Palaeosaturnalis raridenticulatus* KOZUR & MOCK, *Deflandrecyrtium tegumentiformis* n. sp., *Podobursa galeata* n. sp., *Senelella triassica* n. gen., n. sp, *Xiphotheca pseudolonga* n. sp., *Tauridastrum longitubus* n. gen., n. sp. (Figs. 27 and 29).

The boundary between the *Epigondolella primitia* and the *Epigondolella abneptis* Conodont Zones is the FAD for some radiolarian taxa as *Capnodoce longibrachium* n. sp., *Corum fusiformis* n. sp., *Orbiculiforma cedrosensis* PESSAGNO, *Corum speciosum* BLOME, *Capnuchosphaera lenticulata* PESSAGNO,

R: 1-2 specimens, C: 3-5 specimens, A. >5 specimens	96-UKT-707	96-UKT-693
Carinaheliosoma carinata	C	
Kahlerosphaera longispinosa	C	
Dumitricasphaera simplex n. sp.	A	
Spongostylus carnicus	A	
Spongostylus tortilis	A	
Vinassaspongus subsphaericus	A	
Zhamojdasphaera latispinosa	A	
Capnuchosphaera triassica	A	
Divatella austriaca	C	
Weverella tetrabrachiata aspinosa	C	
Triassocrucella baloghi	C	
Paronaella fragilis	A	
Karnospongella bispinosa	C	
Heliosaturnalis transitus	A	
Palaeosaturnalis hugluensis n. sp.	A	
Japonisaturnalis multiperforatus	R	
Pseudoheliodiscus primitivus	A	
Veghicyclia austrica	C	
Orbiculiforma goestlingensis	C	
Tetraspongodiscus nazarovi	R	
Tetraporobrachia haeckeli	A	
Spongosaturnaloides multidentatus	A	
Hindeosphaera bispinosa	A	
Pseudostylosphaera hellenica	C	
Pentactinocarpus acanthicus	A	
Picapora robusta	C	
Spinotriassocampe carnica	R	
Poulpus plabyx	C	
Xiphotheca sp. cf. *X. karpeniassionensis*	C	
CONODONT DATA		
Paragondolella polygnatiformis noah (HAYASHI)		R
Gladigondolella sp.		R

A

R: 1-2 specimens, C: 3-5 specimens, A.: >5 specimens	94-B-1-7
Betraccium deweveri	C
Ferresium philippinense	C
Praemesosaturnalis pseudokahleri	C
Praemesosaturnalis rugosus yehaen. subsp.	C
Pylostephanidium ankaraense	A
Tetraporobrachia composita	R
Pentactinocarpus sevaticus	A
Braginella rudis	A
Canoptum rhaeticum	C
Bipedis acrostylus	A
Spumellaria gen. and sp. indet. B	C

B

	late Triassic															e.J
	Rhaetian															
R: 1-2 specimens, C: 3-5 specimens, A: >5specimens	98-UKT-9	98-UKT-10	98-UKT-12	98-UKT-13	98-UKT-14	98-UKT-15	98-UKT-16	96-UKT-478	98-UKT-17	98-UKT-18	98-UKT-19	98-UKT-20	98-UKT-21	98-UKT-24		
Fontinella habros				C	R											
Fontinella inflata							R									
Fontinella sp. aff. *F. loisensis*			C	R	R	R	R		R	R	C	R				
Paricrioma cistella	R			C	R	C			R	R	R					
Bistarkum sp. aff. *B. ? cylindratum*			R	R					R							
Paronaella pacofiensis	C	C		R	C	R	C	A	C	C	C	C	R			
Paronaella sp. aff. *P. yaogusensis*							R									
Paronaella sp. A	R			R					R	R						
Paratriassoastrum omegaense			A	C	R		C		R							
Paratriassoastrum sp. A								R								
Paratriassoastrum sp. B				R			R	R								
Betraccium inornatum			R	R						R						
Betraccium perilense			R	R		R	R		R	R						
Cantalum alium		R		R	R				R							
Cantalum sp. A					R		R									
Pantanellium inornatum			R									R		R		
Ferresium philippinense		R		C	R		R			C	R					
Ferresium triquetrum	R		R	C	R	R	C	C	R		C		R			
Ferresium sp. A										R	R					
Risella ellisensis	R		R	R	R	R		R	R		R	R				
Risella stalkungiensis	R		R	R	C			R	C	R	R	R	C	R		
Risella tiedoensis	R		C	C	A	R	C	A	A	A	A	C	C			
Risella sp. A			C	C	C	R	R	C	A	A	A	C	C			
Praemesosaturnalis ellipticus n. sp.		R		R		R		C	C							
Praemesosaturnalis sandspitense		C	R		C	R		C	A		C	C				
Pseudoacanthocircus suglyamah. sp.		R			C			A	A							
Pseudoacanthocircus sp. A								R	R	R						
Pentaspongodiscus ? Dihexacanthus	A	C	R	A	R	R	C	R	A	A	R	R				
Spumellaria gen. and sp. indet. A	R		R	R	C				C	C	R					
Spumellaria gen. and sp. indet. B	A	C	A	A	C	A	A	R	A	A	A	A	A			
Pentactinocarpus sevaticus		R	R				R	R	R							
Braginella rudis	R	R		R					R		A	A	A			
Canoptum rhaeticum	C	A	A	A	A	C	A	C	A	A	C	A	C			
Canoptum sp. aff. *C. unicum*			C		R					R						
Deflandrecyrtium breviora			R	R			R		R	R						
Deflandrecyrtium ithacanthum								R	R	C						
Deflandrecyrtium takemurai											C		R			
Tricornicyrtium dikmetasensis n. gen.,n. sp.	R				R		R	R	R	R	R	R	R			
Livarella densiporata	R	R	R		R		R	C		C			C			
Livarella magna n. sp.			C		R		R	A				R	R			
Livarella valida	C	C	C	R	R		A	C	C	R	R	C	R			
Squinabolella sp. aff. *S. causia*	C								R			C				
Squinabolella ? trispinosa												A				
Citriduma asteroides								R	R							
Praecitriduma canthofistula								R	R		R					
Syringocapsa rhaetica			R		R											
Bipedis acrostylus				R					C							
Enoplocampe sp. A									R							
Globolaxtorum cristatum		R			R				R							
Globolaxtorum hullae		R	C			R	R	C	R	A						
Globolaxtorum ? sp. A				R												
Globolaxtorum sp. B								R								
Globolaxtorum sp. C							R	R	R	R						
Laxtorum capitaneum			R				R			R						
Laxtorum perfectum			R			R	A	R	C							
Laxtorum sp. aff. *L. perfectum*										R						
LIASSIC RADIOLARIA																
Parahsuum simplum															C	
Pseudoheliodiscus robustuspinosus															C	
Droltus sp. aff. *D. carinaspinosus*															R	
Dumitricaella pauliani															R	
CONODONT DATA																
Parvigondolella? sp.								R								
Neohindeodella ? sp.									R							
Zieglericonus rhaeticus KOZUR AND MOCK											R					
Grodula deliculata (MOSHER)														R		

C

Figure 28. Distribution and relative abundance of radiolaria and conodonts in sample from A. Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe; B. Ankara Melange, Ankara; C. Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes. e.J. early Jurassic.

	m.C	I.C.-e.N.				early Norian					I.C.-e.N.		early Norian																		
		E. primitia Con.Z.				*E. abneptis* Con.Z.					*E.p.* C.Z.		*E. abneptis* Con. Z.																*E. triangularis* Con. Z.				
		Section 1											Section 2																		
R: 1-2 specimens, C: 3-5 specimens, A.: >5specimens	96-UKT-654-a	97-UKT-117/98-UKT-40	97-UKT-119/98-UKT-41	97-UKT-120	97-UKT-122/98-UKT-43	97-UKT-123/98-UKT-46	97-UKT-124	97-UKT-127/98-UKT-47	97-UKT-128/98-UKT-48	97-UKT-132/98-UKT-50	97-UKT-133/98-UKT-51	97-UKT-136/98-UKT-52	97-UKT-137/98-UKT-53	97-UKT-138/98-UKT-55	96-UKT-661/98-UKT-56	96-UKT-662/98-UKT-57	98-UKT-58	96-UKT-666/98-UKT-59	98-UKT-61	96-UKT-669/98-UKT-62	96-UKT-670/98-UKT-63	98-UKT-64	96-UKT-672/98-UKT-65	98-UKT-66	98-UKT-67	96-UKT-673/98-UKT-68	98-UKT-69	96-UKT-674/98-UKT-70	98-UKT-71	96-UKT-675/98-UKT-72	96-UKT-676/98-UKT-73
Carinaheliosoma carinata		C	A			R	R	A	C		C		A	A	A			A	A	R		R		C	R	R					
Kahlerosphaera ? aspinosa									R		R		C	C	C			R	C	R				R		R					
K. kemerensis adentatus n sp., n. subsp.														C		R															
K. kemerensis kemerensis n. sp., n. subsp.													C	C	R																
Kahlerosphaera norica Group			R			A		C	A		R		A	C				A	A	R				R		C				C	A
Spongostylus carnicus			R			R			R		C		C						R	R										C	C
Spongostylus tortilis			C	R		R			R		A		R					R	C	R										A	C
Capnuchosphaera colemani Group			A					R	A		A		A	C	R			A	A	C		R		R		C					R
Capnuchosphaera concava									R				R							A				C							
Capnuchosphaera constricta									R					R	R			R	C	C				C	C	R					
Capnuchosphaera crassa						R		R	C		R		C			R		C	C	C				A	A	R					
Capnuchosphaera deweveri		R	R			R		C	A		A		A	C	R			C	A	C		C	C	R	R	R				C	A
Capnuchosphaera lea									R				R	R		R															
Capnuchosphaera lenticulata													R																		
Capnuchosphaera silviesensis																										R					A
Capnuchosphaera theloides		C	A	A		C	R	C	A		A		C	C	R	R		R	A	A		C		A	C	C	C				R
Capnuchosphaera triassica		R	C			C		C			C		R					R					R		R						
Capnuchosphaera tricornis			C				C	R	C		C		C	A	R	R		A	A			C	C	C	R	C					C
***Capnuchosphaera* sp. A**																							R								
***Capnuchosphaera* sp. B**													R																		
Dicapnuchosphaera carterae n. gen., n. sp.			R			C			C		R				R			R	A												
Dicapnuchosphaera elegans n. gen., n. sp.									C				C					C	C	R											
Dicapnuchosphaera sengori n. gen., n. sp.													C					A	A	A											
***Dicapnuchosphaera* sp. A**													R																		
Monocapnuchosphaera gracilis n. gen., n. sp.																		C	R												C
Monocapnuchosphaera inflata n. gen., n. sp.		R	R						C		R		C			R		A	A	R											
M. longispina n. gen., n. sp.			C						C				R					A	A	R		R									
M. subtornata dextra n. gen., n. sp., n. subsp.									R				R					C	A					R							
M. subtornata sinistra n. gen., n. sp., n. subsp.			R			R			C				C					C	A	R											
Monocapnuchosphaera tornata n. gen., n. sp.			R															R	R	A			R								
***Monocapnuchosphaera* sp. A**																		R													
***Monocapnuchosphaera* sp. B**																															R
Nodocapnuchosphaera tuzcuae n. gen., n. sp.			R		R	C		R	C		R		A	A	C	R		A	A	A		C			R	R	R				
***Catoma* sp. A**											R																				
***Catoma* sp. B**									R																						
Icrioma cruciformis n. sp.			C				R	C	C		A		C	A	R	R		A	A	R			R								
Icrioma tetrancistrum			R				R		C		C		A	C	R	R	A	A	A	C		R			R						C
***Icrioma* sp. A**													R					R	R												
Paricrioma deweveri n. gen., n. sp.													C																		
Paricrioma* sp. aff. *P. deweveri n. gen., n. sp.													A			R															
Braginastrum curvatus n. gen., n. sp.			R										A	C				A	A	A						R					
Sarla dumitricai n. comb.			C	C				R	C		A		A	R	R	R		R	A	R						R	R				C
Sarla robusta n. sp.						R	R						C	C					R				R								
Sarla transita		R	A	C		C		C	A		A		A	A	R	R		A	A	A			R								
Sarla vetusta			C			R			C		R		C	R	R			R	C				R			R				R	
Sarla vizcainoensis									R				R	R	R			R	R												C
Crucella tenuis n. sp.									R		R		C						R												
Triassocrucella triassica		R	R					R					A					R	C												R
Paronaella norica			R				R		A		R		A	C	C			A	C	R	R					A				A	A
Paronaella reiflingensis													C			R															
Paronaella trammeri			R						R		R		C	C	R			R	R				R							A	A
Natraglia unica																		C	C								C				
Paratriassoastrum cordevolicum						R							R																		
Capnodoce anapates									R				R	R									R								
Capnodoce crystallina Group			R					C	C		R		C	C	R	C		R	C	A						C					A
Capnodoce extenta Group			A			C		R	C		A		A	C	R			C	C	A				C		R					
Capnodoce longibrachium n. sp.							C	R	A				A	A	R	C		A	A	A			A	A	A	C	R				
Capnodoce media		C	A	A	R			R	R		A		R																		
Capnodoce* sp. cf. *C. minuta		R																													
Capnodoce serisa																									R	C	R			R	A
Loffa mulleri				R			R		R		C		R		R			R	R												
Loffa vesterensis			R								R		C					R													
***Loffa* sp. A**						R																									
Renzium adversum																									R	C					

Figure 29. Distribution and relative abundance of radiolaria and conodonts in Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, *E.p.: Epigondolella primitia* Con. Z., I.C.-e.N.: latest Carnian-earliest Norian, m.C.: middle Carnian or older.

	m.C.	l.C.-e.N.				early Norian					l.C.-e.N.		early Norian																		
		E. primitia Con.Z.				E. abneptis Con.Z.					E.p. C.Z.		E. abneptis Con. Z.														E. triangularis Con. Z.				
	Section 1										**Section 2**																				
R: 1-2 specimens, C: 3-5 specimens, A.: >5specimens	96-UKT-654-a	97-UKT-117/98-UKT-40	97-UKT-119/98-UKT-41	97-UKT-120	97-UKT-122/98-UKT-43	97-UKT-123/98-UKT-46	97-UKT-124	97-UKT-127/98-UKT-47	97-UKT-128/98-UKT-48	97-UKT-132/98-UKT-50	97-UKT-133/98-UKT-51	97-UKT-136/98-UKT-52	97-UKT-137/98-UKT-53	97-UKT-138/98-UKT-55	96-UKT-661/98-UKT-56	96-UKT-662/98-UKT-57	98-UKT-58	96-UKT-666/98-UKT-59	98-UKT-61	96-UKT-669/98-UKT-62	96-UKT-670/98-UKT-63	98-UKT-64	96-UKT-672/98-UKT-65	98-UKT-66	98-UKT-67	96-UKT-673/98-UKT-68	98-UKT-69	96-UKT-674/98-UKT-70	98-UKT-71	96-UKT-675/98-UKT-72	96-UKT-676/98-UKT-73
Renzium tricarinatum n. sp.			R						C																						
Renzium **sp. A**													R																		
Renzium **sp. B**																							R								
Renzium **sp. C**																								R							
Betraccium **sp. A**									C					R																	
Betraccium **sp. B**														R				R													
Gorgansium thayeri									R		R																				
Gorgansium **sp. A**														R																	
Gorgansium **sp. B**									R				R																		
Gorgansium **sp. C**									R																						
Pantanellium dawsoni											C																				
Pantanellium rothwelli									R																						
Karnospongella bispinosa			R						R		R		C	R				R	R												
Palaeosaturnalis dotti Group																															C
Palaeosaturnalis dumitricai n. sp.			R						R		C		C					C	A	R											
Palaeosaturnalis karnicus													R	R				R													
Palaeosaturnalis latiannulatus									C		C		A	A				C		C						C					
Palaeosaturnalis mocki									R				R	R					C	R											
Palaeosaturnalis raridenticulatus									C				A	A					R	R											
Palaeosaturnalis triassicus									R		A		R	R				A	A	A		R		R		C					
Praehexasaturnalis burnensis																															A
Praehexasaturnalis tenuispinosus																															A
Pseudoheliodiscus elongatus n. sp.																															A
Pseudoheliodiscus validus																															R
Stauroacanthocircus kayai n. sp.						R			C									A	A	C											
Stauroacanthocircus ? poetschensis																										C					A
Veghicyclia **sp. aff. *V. globosa***													R																		
Veghicyclia haeckeli									R				R																		
Orbiculiforma cedrosensis									R				A	R	R			R	C	R											R
Orbiculiforma octogonalis n. sp.								R	C		C		A		R	R		C	C	R		R									
Orbiculiforma plana n. comb.						R			R									C	R	R											
Orbiculiforma vulgaris n. comb.									R		C		C																		
Orbiculiforma **sp. A**																R															
Tauridastrum longitubus n. gen., n. sp.																			C												
Xiphosphaera fistulata																														R	A
Spumellaria gen. and sp. indet. B													A	R					R											A	
Triarcella sulovensis													C	A																	
Pentactinocarpus tetracanthus			C			R			C		C		C	A	C			C	C	C											
Bulbocyritium globosus n. sp.									R				C					R													
Bulbocyritium insolitus n. comb.									A		R		C	R				A					R								
Bulbocyritium reticulatum		R	C						A		C		A	R				A	C	C				R			R				C
Japonocampe nova Group			A	C		A			A		A		A	R	R			A	C	C			A	C	A		A		A		
Pachus firmus			C			R		R	R		C		C					R						R			R				
Pachus longinquus			C			R			R		C		C					R													
Pachus multinodosus n. sp.			A			C			A		A		A	R		R		A	C	R			R	R	R		C				
Deflandrecyritium curvatum			R						C				C																		
Deflandrecyrtium inaquiporatum n. sp.									R		R		C					A	C	C											
Deflandrecyrtium parvus n. sp.									C				C					C													
Deflandrecyrtium pessagnoi n. sp.		R	R						A		A		R					A	C	A					R						R
Deflandrecyrtium tegumentiformis n. sp.									C				A			R		C	C	R			R			R					
Deflandrecyrtium ? sp. A														R																	
Deflandrecyrtium **sp. B**									C																						
Haeckelicyrtium subcircularis n. sp.											R		C																		
Alatipicapora gediki n. gen., n. sp.											R		R	C				R													
Alatipicapora **sp. A**																			R												
Picapora elegantissima n. sp.									C		C				R																
Picapora **sp. aff. *P. robusta***			R			R							R																		
Nakasekoellus inkensis			R						R		R		R	R																	
Nakasekoellus pessagnoi																		R													
Corum candidum						R			R		R		C										R				R		R		
Corum fusiformis n. sp.									R				R	R									C						R		
Corum regium		R	C	C		R		R	C		C		A	R				C	C	R			A	R		C	A		C		R
Corum speciosum									R				R	R				R					R	R							
Kozuricyrtium carinatus n. gen., n. sp.			A			A		R	A		A		A	R				R	C	R											
Kozuricyrtium pulchra n. gen., n. sp.			A			A			A		A		A	C				C	A	C											
Pseudosaturniforma carnica									C				A	C				C	R	R											
Pararuesticyrtium ? anatoliaensis n. sp.									R		C		C	R				R	R												

Figure 29. Continued.

	m.C	l.C.-e.N.				early Norian					l.C.-e.N		early Norian																		
		E. primitia Con.Z.				E. abneptis Con.Z.					E.p. C.Z.		E. abneptis Con. Z.															E. triangularis Con. Z.				
	Section 1										Section 2																				
R: 1-2 specimens, C: 3-5 specimens, A.: >5specimens	96-UKT-654-a	97-UKT-117/98-UKT-40	97-UKT-119/98-UKT-41	97-UKT-120	97-UKT-122/98-UKT-43	97-UKT-123/98-UKT-46	97-UKT-124	97-UKT-127/98-UKT-47	97-UKT-128/98-UKT-48	97-UKT-132/98-UKT-50	97-UKT-133/98-UKT-51	97-UKT-136/98-UKT-52	97-UKT-137/98-UKT-53	97-UKT-138/98-UKT-55	96-UKT-661/98-UKT-56	96-UKT-662/98-UKT-57	98-UKT-58	96-UKT-666/98-UKT-59	98-UKT-61	96-UKT-669/98-UKT-62	96-UKT-670/98-UKT-63	98-UKT-64	96-UKT-672/98-UKT-65	98-UKT-66	98-UKT-67	96-UKT-673/98-UKT-68	98-UKT-69	96-UKT-674/98-UKT-70	98-UKT-71	96-UKT-675/98-UKT-72	96-UKT-676/98-UKT-73
Pararuesticyrtium mediobulbosum n. sp.		R	R						C		C		C		R				R												
***Pararuestiyrtium* sp. A**													R																		
Annulopoulpus antalyaensis n. sp.			R			C			A		R		A					A	C						R						
Annulopoulpus reticulatus			R						R		R		C		R			C	C	C											C
Neopyletonema procera			R										C		R					R											R
Parapoulpus oertlii			R	R					R				R				R	R							R						
***Parapoulpus* sp. A**														R																	
Poulpus piabyx			A	R		C		R	C		A		C	C				C	C	C				C	C	C	R				A
Poulpus transitus		R							R				R	R				R	R	R											
Sanflippoella lengeranlii n. sp.									C		C		C	R				R													
Spinopoulpus noricus			R						R		R		R					R	C							R					
Veghia sulovensis													C						R												
Veghia* sp. aff. *V. sulovensis						R							R																		
Silicarmiger curvatus														R					R												
Podobursa akayi n. sp.			R		R	R		C				R	A	R	R	R		A	A	C				R							
Podobursa galeata n. sp.									R				R		R	R		C	R	R											
Podobursa primitiva n. sp.			C			R			C		R		A		R	R		A	A	C			R								R
Podobursa turriformis n. sp.			R										C	C				C	C	C											
Podobursa yazgani n. sp.			R						R		R		C					R	R	R											
***Podobursa* sp. A**																		R	R												
Syringocapsa extansa n. sp.			C								R		R	R	C			C	A			R				R					R
Syringocapsa turgida			R	R		C		R			A		C		C			R	R					C		R	A				
***Syringocapsa* sp. A**														R																	
***Syringocapsa* sp. B**											R																				
Annulotriassocampe baldii Group			A			R		R	A		A		C	C				R													
Annulotriassocampe proprium			A			R					A		R	R	R			R													
Annulotriassocampe ? sp. A				R																											
Praeprotunuma antiqua n. gen., n. sp.			C			R			R		A		A	C	R			C	A	A		R	C			R	R		R		
Senelella triassica n. gen., n. sp.							R		A				A	C	R																
Xiphotheca irregularis n. sp.						R			R		R		C						R												
Xiphotheca longa		R	R		R			R	C				A	C				R	A	C					R	A			R	A	A
Xiphotheca pseudolonga n. sp.															R			R	C				R								
Xiphotheca rugosa		R	A	C		A			A		A		A	A		R		C	R	R						R				C	R
Xiphotheca ? transitus n. sp.															R			C	A	A											
Canesium lentum			R						R		C		R		R			R		C					R	R	C				R
Mostlericyrtium sitepesiformis n. gen., n. sp.		R	A	A	C	C		R	A		A		A	R				A	C	C			C	C		C				C	C
Mostlericyrtium striata n. gen., n. sp.			C	R		R			R		C		A	R		R		R	R	R				R		R					R
Papiliocampe ovalis n. gen., n. sp.									R		R		C	R																	
Papiliocampe tokerae n. gen., n. sp.									R		R			A		R															
Trialatus praerobustus		R	A			R		R	C		C		A	A		R		A	C	A			C	R		R					
Trialatus procerus n. sp.			A						C		C		A	A		R		A	C	C				R	R	R					C
Nassellaria gen. and sp. indet. A			R				R		A		R		A	C		R		R	R	C											
Nassellaria gen. and sp. indet. B			R			R			R				R	R				R	R												
CONODONT DATA																															
***Gladigondolella* sp.**	R																														
Epigondolella permica (HAYASHI)			R		R	R					C	R	R																		
Epigondolella primitia (MOSHER)		R						R				C				R															
Epigondolella abneptis (HUCKERIEDE)						R		R	C	C			R	R		C	C				R		A			R	C	R	R		
Epigondolella pseudoechinatus KOZUR										R	R		R			R															
Epigondolella spatulata (HAYASHI)																	R				R										
Epigondolella triangularis (BUDUROV)																											C	C	C	A	A
Neohindeolella dropla (SPASOV& GANEV)									R				R																		

Figure 29. Continued.

Stage		Substage	Ammonoid Zone/Subzone Standard		Conodont Zone/Subzone Tethys/Western Pacific'		North America
UPPER TRIASSIC	Rhaetian	Upper Rhaetian	Chor. marshi	Choristoceras marshi	Misikella ultima		Norigondolella sp.
				Chorist. ammonitiforme	Misikella posthern=steini	Misikella koessenensis	Misik. posthernsteini
		Lower Rhaetian	"Ch." haueri	Vandaites stuerzenbaumi			Mockina mosberi
				"Ch." haueri		Misikella hern=steini-Misikella posthernsteini	
			Cochloceras suessi				
	Norian	Sevatian	Sagenites reticulatus		M. hernsteini-P. andrusovi		Mockina bidentata
			Sagenites quinquepunctatus		Mockina bidentata	Subzone 2	
			Halorites macer			Subzone 1	Mockina serrulata
		Alaunian	Argosirenites argonautae		Mockina postera		Mockina postera Mockina elongata
			Cyrtopleurites bicrenatus		Epigondolella spiculata Mockina ex gr. matthewi		Epigond. spiculata Mockina multidentata
		Early Norian	Juvavites magnus		Epigondolella triangularis-Norigondolella hallstattensis		Epigondolella triangularis
			Malayites paulckei		Epigondolella abneptis		Epigondol. abneptis
			Stikinoceras kerri		Epigondolella primitia		E. primitia
	Carnian	Tuvalian	Klamathites macrolobatus		Epigondolella pseudodiebeli-Metapolygnathus communisti		Metapolygnathus communisti
			Tropites subbullatus		Epigondolella nodosa Paragondolella carpathica		Epigondolella nodosa
			Tropites dilleri		Paragondolella polygnathiformis		Paragondolella polygnathiformis
		Julian	Austrotrachyceras austriacum		Gladigondolella tethydis-Paragondolella polygnathiformis		
			Trachyceras aonoides				
		Cordevolian	Trachyceras aon		Budurovignathus diebeli-Paragondolella polygnathiformis		
			D. canadiensis-P. sutherlandi				
MIDDLE TRIAS.	Ladinian	Longobardian	Frankites regoledanus		Budurovign. supralongobardica		Budurovignathus mungoensis
			Protrachyceras archelaus		Budurovignathus mungoensis		
			Protrachyceras gredleri		Budurovignathus hungaricus		?
		Passanian	Eoprotra=chyceras curionii	"E." recubariense	Budurovignathus truempyi denticulata		Budurovignathus truempyi denticulata
				E. curionii			
			Nevadites secedensis		Paragondolella ? tranmeri-Neogondolella aequidentata		Neogondolella aldae-N. aequidentata
			Reitziites reitzi	Aplococ. avisianum R. reitzi	Paragondolella alpina-Paragondolella ? tranmeri		Paragondolella alpina

Figure 30. Ladinian to Rhaetian ammonoid and conodont zonations after Kozur (1997 and Personal Communication)

Sarla vizcainoensis PESSAGNO, *Pantanellium rothwelli* PESSAGNO & BLOME and Spumellaria gen. and sp. indet. B. *Capnodoce longibrachium* n. sp. is very abundant and index taxon for this zone, which disappear at the basal part of the *Epigondolella triangularis* Conodont Zone (Figs. 27 and 29).

The radiolarian fauna of the *Epigondolella triangularis* Conodont Zone (upper part of early Norian) in Yaylakuzdere Measured Section have differences from those of the *Epigondolella abneptis* Conodont Zone. For the first time, *Capnodoce serisa* DE WEVER and *Stauroacanthocircus* ? *poetschensis* KOZUR & MOSTLER appear very close the top of the *Epigondolella abneptis* Conodont Zone and become so abundant in the *Epigondolella triangularis* Conodont Zone. Upper part of the *Epigondolella triangularis* Conodont Zone is especially very rich in Satunalid fauna as *Stauroacanthocircus* ? *poetschensis* KOZUR & MOSTLER, *Praehexasaturnalis burnensis* (BLOME), *Praehexasaturnalis tenuispinosus* (DONOFRIO & MOSTLER), *Pseudoheliodiscus elongatus* n. sp., *Pseudoheliodiscus validus* (DONOFRIO & MOSTLER) and *Palaeosaturnalis dotti* (BLOME) Group. These saturnalids are also mainly present in the middle Norian to early Jurassic strata. *Xiphosphaera fistulata* CARTER and *Kahlerosphaera norica* KOZUR & MOCK with short primary spines are also important indicators for upper part of the *Epigondolella triangularis* Conodont Zone. Different from Carter (1991), the *Epigondolella triangularis* Conodont Zone in the Yaylakuzdere Measured Section does not have species of genus *Harsa* CARTER or it is not determined due to poor preservation. Therefore, informal association of Radiolarians could be named as "*Capnodoce serisa- Xiphosphaera fistulata- Kahlerosphaera norica* with short arms" for the upper part of the *Epigondolella triangularis* Conodont Zone (upper part of early Norian) instead of "*C. fragilis* (herein this report *C. serisa*)- *Harsa siscwaiensis- Xiphosphaera fistulata*" as supposed by Carter (1991) (Figs. 27 and 29).

4. 1. 4. Sample from the Ankara Ophiolitic Melange

The assemblages of the late Norian Radiolarians of the samples obtained from block from the Ankara Ophiolitic Melange is characterized by *Betraccium deweveri* PESSAGNO & BLOME, *Ferresium philippinense* YEH & CHENG, *Praemesosaturnalispseudokahleri* SUGIYAMA, *Praemesosaturnalis rugosus yehae* n. subsp., Spumellaria gen. and sp. indet. B, *Pylostephanidium ankaraense* BRAGIN & TEKIN, *Tetraporobrachia composita* CARTER, *Pentactinocarpus sevaticus* KOZUR & MOSTLER, *Braginella rudis* (BRAGIN), *Canoptum rhaeticum* KOZUR & MOSTLER, *Bipedis acrostylus* BRAGIN (Figs. 27 and 28.B). This assemblage clearly indicates the late Norian *Betraccium deweveri* Subzone of *Betraccium* Zone (Blome, 1984) due to presence of index-species.

Some taxa together with index species are well known world wide and only present in late Norian as *Praemesosaturnalis pseudokahleri* SUGIYAMA, *Pylostephanidium ankaraense* BRAGIN & TEKIN, *Tetraporobrachia composita* CARTER (Figs. 27 and 28.B). The other taxa mainly are still present Rhaetian and disappeared at the end of Triassic like the other Rhaetian taxa. These data as well as absence of characteristic early Norian taxa such as *Capnodoce* and *Nakasekoellus* and the absence of the genera *Risella*, *Proparvicingula*, *Laxtorum* and *Globolaxtorum*, which is typical of the Rhaetian stage, reveal that the age of the studied assemblage could be determined as of the late Norian.

4. 1. 5. The Dikmetas Measured Section

The radiolarian assemblages of the Rhaetian part of the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes exhibit close similarity to those of the Queen Charlotte Islands which was investigated by Carter (1993), even zone fossils have not been determined (Fig. 26.A). Three different assemblages and two zones (the *Globolaxtorum tozeri* and the *Proparvicingula monoliformis* Zone) were established by Carter (1993) in Rhaetian.

The contact relation between the late Norian Kasimlar Formation and overlying the Rhaetian-Liassic Kayabuku Formation is not clear in the Dikmetas Measured Section. The base of the Kayabuku Formation corresponds to 2b and 2c assemblages proposed by Carter (1993) because of the occurrence of *Risella stalkungiensis* CARTER, *Risella tledoensis* CARTER and *Globolaxtorum cristatum* CARTER in the Dikmetas Measured Section (Figs. 27 and 28.C).

Sample 98-UKT-12 contains different assemblages than the lower levels. For the first time *Paratriassoastrum omegaense* CARTER, *Laxtorum capitaneum* CARTER and *Laxtorum perfectum* CARTER appear in this level and it corresponds to 2d assemblages proposed by Carter (1993). Upper part of the Rhaetian is very rich in radiolarian fauna in the section and this part could corresponds Assemblage 3 proposed by Carter (1993) (Figs. 26.A, 27 and 28.C).

Conodont fauna (*Zieglericonus rhaeticus* KOZUR & MOCK) from sample 98-UKT-19 also indicates late Rhaetian (*Misikella ultima* Con. Z.) age together with radiolarian fauna (Kozur, Personal Communication; Fig. 30)

Towards the upper part of the section, radiolarian fauna radically change in sample 98-UKT-24, 1 meter above sample 98-UKT-21. Sample 24 is characterized by radiolarian fauna as *Parahsuum simplum* YAO, *Pantanellium inornatum* PESSAGNO & POISSON, *Pseudoheliodiscus robustuspinosus* KOZUR & MOSTLER, *Droltus* sp. aff. *D. carinaspinosus* KOZUR & MOSTLER and *Dumitricaella pauliani* DE WEVER. *Parahsuum simplum* YAO is one of the characteristic species for early Jurassic according to Yao (1982) and later the *Parahsuum simplum* Assemblage have also accepted by many researchers (Fig. 26.B). Although, Carter et. al (1998) found this species only in Sinemurian, fauna from the Dikmetas Measured Section clearly indicate the *Parahsuum simplum* Assemblage at the base of the early Jurassic. *Pseudoheliodiscus robustuspinosus* KOZUR & MOSTLER and *Droltus carinaspinosus* KOZUR & MOSTLER are also found at the base of early Jurassic in Austria (Kozur & Mostler, 1990) which is similar to the Dikmetas Measured Section. The Dikmetas Measured Section reveals that only *Pantanellium inornatum* PESSAGNO & POISSON could survive after Rhaetian, the other fauna disappear at the Rhaetian-Hettengian boundary (Figs. 27 and 28.C).

5. SYSTEMATIC PALEONTOLOGY

In this chapter, following abbreviations are utilized for the measurements;

HT: Holotype, Min.: Minimum, Max.: Maximum, Av.: Average, Exc.: Excluding, Incl.: Including

PHYLUM **PROTOZOA**

SUBPHYLUM **SARCODINA**

CLASS **ACTINOPODA**

SUBCLASS **RADIOLARIA** MÜLLER, 1858

ORDER **POLYCYSTINA** EHRENBERG, 1838 emend. RIEDEL, 1967b

SUBORDER **SPUMELLARIINA** EHRENBERG, 1875

FAMILY **ACTINOMMIDAE** HAECKEL, 1862 emend. RIEDEL, 1967b

Genus ***Carinaheliosoma*** KOZUR & MOSTLER, 1981

Carinaheliosoma KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 68
emend LAHM, 1984, p. 65

Type species: *Carinaheliosoma densiporata* KOZUR & MOCK, 1981.

Carinaheliosoma carinata (KOZUR & MOSTLER, 1979)
Plate 1, figures 1-2

Heliosoma carinata KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, pp. 50-51, pl. 9, figs. 1-3

Carinaheliosoma carinata (KOZUR & MOSTLER, 1979)
KOZUR & MOSTLER, 1981, p. 68
LAHM, 1984, pp. 65-66, pl. 11, fig. 9

Range (this study): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Gostling and Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Kahlerosphaera*** KOZUR & MOSTLER, 1979

Kahlerosphaera KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 64

Type species: *Kahlerosphaera parvispinosa* KOZUR & MOSTLER, 1979.

Kahlerosphaera ? aspinosa KOZUR & MOCK, 1981
Plate 1, figures 3-4

Kahlerosphaera ? aspinosa KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, pp. 36-37, pl. 47, fig. 3

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Western Karpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Kahlerosphaera kemerensis n. sp.
Plate 1 , figures 5-9

Derivation of Name: Because of the its occurrence near Kemer town, Antalya, Turkey.

Holotype: See subspecies.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: See subspecies.

Description: Cortical shell medium in size, subsphaerical to subtriangular in outline; consists double layered shell. Outer layer of variably sized raised polygonal pore frames with subcircular to trigonal pores, inner layer of small polygonal pore frames. Symmetrically arranged three primary spines situated in one plane. Primary spines short, straight, triradiate and tapering distally, pass to circular spine distally and pointed terminally. Three wings formed by extension of three ridges and wings widened distally.

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yugoslavia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Kahlerosphaera kemerensis* n. sp. differs from *K. aspinosa* KOZUR & MOCK and *K. norica* KOZUR & MOCK by possessing wing like extension from three ridges instead of spines.

Kahlerosphaera kemerensis adentatus
n. sp., n. subsp.
Plate 1, figures 5-6

Derivation of Name: Due to absence of denticles on the wings.

Holotype: The specimen on plate 1, figure 5. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 5 specimens.

Description: With the character of the species, triradiate spine ended with long circular spines and three wings widened distally, no denticles present on lower and upper parts of the wings.

Measurements (μm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	150	150	180	165
Length of triradiate shaft	130	130	130	130
Length of straight spine	150	-	-	150
Width of wing (proximally)	70	50	70	60
Width of wing, distally	100	60	100	80

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: See the other subspecies.

Kahlerosphaera kemerensis kemerensis n. sp., n. subsp.

Plate 1, figures 7-9

Kahlerosphaera ? sp.

OBRADOVIC & GORICAN, 1988, pl. 4, fig. 13

Derivation of Name: Same as species.

Holotype: The specimen on plate 1, figure 7. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey. (See locality description)

Material: 9 specimens.

Description: With the character of the species, triradiate spines terminated with short circular spines and wings have denticles at the top of its surface.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of cortical shell	153	147	160	153
Length of triradiate shaft	133	133	147	142
Length of straight spine	33	33	80	55
Width of wing proximally	60	60	73	64
Width of wing distally	67	67	87	76

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yugoslavia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *K. kemerensis kemerensis* n. sp., n. subsp. differs from *K. kemerensis adentatus* n. sp., n. subsp. by having denticles at the top margin of wing extending out from the three ridges and shorter circular primary spines at the distal end of triradiate spines.

Kahlerosphaera longispinosa KOZUR & MOSTLER, 1979

Plate 1, figure 10

Kahlerosphaera longispinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 65, pl. 14, figs. 3, 7

LAHM, 1984, pp. 72-73, pl. 12, fig. 12

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Gostling and Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Kahlerosphaera norica KOZUR & MOCK, 1981Group

Plate 1, figures 11-12

Kahlerosphaera norica KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 36, pl. 15, fig. 4

Kahlerosphaera norica KOZUR & MOCK Group

SUGIYAMA, 1997, p. 181

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Occurrence: Westkarpats; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It includes forms which have different length and direction of branches as explained by SUGIYAMA (1997).

FAMILY **STYLOSPHAERIDAE** HAECKEL, 1862 emend. KOZUR & MOSTLER, 1979

Genus ***Dumitricasphaera*** KOZUR & MOSTLER,1979 emend. LAHM, 1984

Dumitricasphaera KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 60
emend. LAHM, 1984, p. 70

Type species: *Dumitricasphaera goestlingensis* KOZUR & MOSTLER,1979.

Dumitricasphaera simplex n. sp.
Plate 2, figures 1-2

Derivation of Name: From the Latin *simplex* = simple, due to its simple shape.

Holotype: The specimen on plate 2, figure 1. Sample 96-UKT-707. Deposited at MTA.

Type Locality: Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey (See locality description).

Material: 7 specimens.

Description: Spherical, spongy shell with two long polar spines situated at the opposite directions. Polar spines three bladed and straight. Before the termination of the polar spines, three short spines branch off from the ridges and slightly curved towards the central shell. These three spines simple, without denticles on the surface.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	180	167	180	173.5
Length of polar spines	210	193	210	201.5
Width of polar spines	60	47	60	53.5
Length of spines at the end of polar spines	100	100	100	100

Range (this study): Late Triassic; middle Carnian.

Occurrence: Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Remarks: *Dumitricasphaera simplex* n. sp. differs from *D. goestlingensis* KOZUR & MOSTLER by having longer polar spines and three simple short spines at the end of polar spines that never reach to each other. It differs from *D.* sp. A by possessing longer and thinner polar spines.

***Dumitricasphaera* sp. A**
Plate 2, figures 3-4

Dumitricasphaera ? cf. *trispinosa* (KOZUR & MOSTLER, 1979)
GORICAN & BUSER, 1990, p. 143, pl. 4, fig. 14

Brief Definition: Spherical, spongy shell with two polar spines situated at the opposite direction. Polar spines short, strong, straight and three bladed with wide ridges and deep grooves. Before the distal end, three short spines branch off from every ridge and slightly curved towards the central shell, tapering distally. No denticles present on these secondary spines.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of cortical shell	135	129	135	132
Length of polar spines	120	98	133	121
Width of polar spines	50	48	53	51
Length of secondary spines	90	86	90	87.5

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Zone/*S. rarauana* Rad. Subz.- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Vrisic, Slovenia; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Dumitricasphaera* sp. A has been compared to *D. simplex* n. sp. under latter

species. It can be also differentiated from *D. trispinosus* (KOZUR & MOSTLER) by possessing secondary spines branch off from polar spines curved inwardly (instead of outwardly).

Genus ***Spongostylus*** HAECKEL, 1882

Spongostylus HAECKEL

HAECKEL, 1882, p. 455

Type species:*Spongostylus hastatus*HAECKEL 1887.

Spongostylus carnicus KOZUR & MOSTLER, 1979

Plate 2, figures 5-6

Spongostylus carnicus KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 56, pl. 9, figs. 5, 6, 8

KOZUR & MOSTLER, 1981, p. 69, pl. 38, fig. 3

LAHM, 1984, p. 69, pl. 12, fig. 4

YEH, 1989, p. 67, pl. 13, fig. 8

CARTER, ORCHARD & TOZER, 1989, pl. 1, fig. 5

GRAPES, LAMB, CAMPBELL, SPORLI & SIMES, 1990, Fig. 8.O

HALEMIC & GORICAN, 1995, pl. 2, figs. 18-19

KNIPPER, SATIAN & BRAGIN, 1997, pl. 2, fig. 1

Spongostylus aequicurvistylus LAHM

LAHM, 1984, pp. 69-70, pl. 12, fig. 5

Range (this study): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian-early Norian (*E. triangularis* Con. Z.).

Occurrence: Gostling, Grossreifling, Austria; Westkarpats; East-Central Oregon, USA; Queen Charlotte Islands, British Columbia, Canada; New Zealand; Northwest Croatia; Sevan-Akera, Lesser Caucasus; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Recent works on this species from the rich material of Gostling display that spines could curved to every direction individually. So the *Spongostylus aequicurvistylus* LAHM could be pronounced as junior synonym of this species.

Spongostylus tortilis KOZUR & MOSTLER, 1979

Plate 2, figures 7-8

Spongostylus tortilis KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 56-57, pl. 4, fig. 2; pl. 11, fig. 6; pl. 18, fig. 2

KOZUR & MOSTLER, 1981, p. 69, pl. 40, fig. 2, pl. 56, fig. 3

LAHM, 1984, pp. 68-69, pl. 12, fig. 3

KNIPPER, SATIAN & BRAGIN, 1997, pl. 1, figs. 5, 6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. triangularis* Con. Z.).

Occurrence: Gostling, Grossreifling, Austria; Westkarpats; Sevan-Akera, Lesser Caucasus; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Vinassaspongus*** KOZUR & MOSTLER, 1979

Vinassaspongus KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 65

Type Species: *Vinassaspongus subsphaericus* KOZUR & MOSTLER, 1979.

Vinassaspongus erendili n. sp.

Plate 2, figures 9-10

Derivation of Name: This species is named for M. Sc. Murat ERENDIL, General Directorate of Mineral Research and Exploration (MTA),

Ankara, Turkey, in honour of his contributions to the study of Turkish geology.

Holotype: The specimen on plate 2, figure 9. Sample 96-UKT-551. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 46 specimens.

Description: Shell subspherical to slightly discoidal, spongy with polygonal (mainly hexagonal) elevated pore frames and circular pores in different size. Three main spines situated in one plane and generally at same distance to each other. Proximal two of the third of main spines triradiate with wide ridges and deep grooves. Proximal one of the third of the main spines straight then strongly twisted. Distal one of third of the main spines triangular, straight, tapering abruptly in distal part pass the needle-like short spine, circular in cross section.

Measurements (μm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	150	110	150	130
Length of main spines	170	170	190	180

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Vinassaspongus erendili* n. sp. could easily be distinguished from *V. subsphaericus* KOZUR & MOSTLER by having larger cortical shell, longer and different shape of main spines (proximally straight then strongly twisted and straight distally instead of continuos twisted spines).

Vinassaspongus subsphaericus KOZUR & MOSTLER, 1979

Plate 2, figures 11-12

Vinassaspongus subsphaericus KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 66, pl. 3, fig. 5-7; pl. 5, fig. 5

KIDO, 1982, pl. 2, fig.8

LAHM, 1984, pp. 73-74, pl. 13, fig. 2

GORICAN & BUSER, 1990, p. 160, pl. 2, fig. 6

Vinassaspongus cf. *subsphaericus* KOZUR & MOSTLER

NON GORICAN & BUSER, 1990, p. 160, pl. 2, fig. 7

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; middle Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; middle Carnian.

Occurrence: Gostling and Grossreifling, Austria; Central Japan; Vrsic and Mokronog, Slovenia; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya and Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Genus ***Zhamojdasphaera*** KOZUR & MOSTLER, 1979

Zhamojdasphaera KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 66-67

Type Species: *Zhamojdasphaera latispinosa* KOZUR & MOSTLER, 1979.

Zhamojdasphaera latispinosa KOZUR & MOSTLER, 1979

Plate 2, figure 13

Zhamojdasphaera latispinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 67, pl. 7, figs. 7-9; pl. 12, fig. 5

LAHM, 1984, pp. 74-75, pl. 13, fig. 5

GORICAN & BUSER, 1990, p. 161, pl. 2, fig. 8

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian- late Triassic; middle Carnian.

Occurrence: Gostling and Grossreifling, Austria; Central Slovenia; Haciyunuslar

Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

FAMILY **TRIPOSPHAERIDAE** VINASSA DE REGNY, 1898

Genus ***Fontinella*** CARTER, 1993

Fontinella CARTER

CARTER, 1993, pp. 42-43

Type Species: *Fontinella louisensis* CARTER, 1993.

Fontinella habros CARTER, 1993

Plate 3, figure 1

Fontinella habros CARTER

CARTER, 1993, p. 44, pl. 2, figs. 13, 16

CARTER, WHALEN & GUEX, 1998, p. 56, pl. 9, fig. 9

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- early Jurassic; Hettengian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Fontinella inflata CARTER, 1993

Plate 3, figure 2

Sarla sp.

SPORLI & AITA, 1988, p. 21, no. 9

Fontinella inflata CARTER

CARTER, 1993, pp. 44-45, pl. 2, figs. 5, 6, 17

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; ? late Norian-Rhaetian.

Occurrence: Waipapa Terrane, Kawakawa Bay, New Zealand; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Fontinella* sp. aff. *F. louisensis CARTER, 1993

Plate 3, figure 3

aff. *Sarla* sp.

SPORLI & AITA, 1988, p. 21, No. 3, 10

aff. Gen. nov. A sp. 1

CARTER, 1990, pl. 1, fig.1

aff. *Triactoma* (?) sp. A

YEH, 1992, p. 62, pl. 1, fig. 10

aff. *Fontinella louisensis* CARTER

CARTER, 1993, pp. 45-46, pl. 2, figs. 1-4, 14

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from holotype by possessing less twisted primary spines.

FAMILY **CAPNUCHOSPHAERIDAE** DE WEVER, 1979 emend. PESSAGNO, 1979 and emend. BLOME, 1983

SUBFAMILY **CAPNUCHOSPHAERINAE** DE WEVER, 1982

Genus ***Capnuchosphaera*** DE WEVER,1979 emend. PESSAGNO, 1979, emend. BLOME, 1983

Capnuchosphaera DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 23

emend. PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 173

emend. BLOME, 1983, p. 13

Sulovella KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 77

Type Species: *Capnuchosphaera triassica* DE WEVER, 1979.

Capnuchosphaera colemani BLOME, 1983 Group

Plate 3, figures 4-5

Capnuchosphaera theloides var a DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 84, pl. 4, fig. 1

NAKASEKO & NISHIMURA, 1979, pp. 75-76, pl. 7, fig. 7

DE WEVER, 1982b, pp. 158-159 pl. 6, fig. 8

Capnuchosphaera colemani BLOME

BLOME, 1983, p. 15, pl. 1, figs. 1, 2, 6, 7, 10, 15

BLOME, 1984, p. 28, pl. 3, fig. 8

YEH, 1989, p. 52, pl. 11, fig. 12; pl. 12, fig. 6

Capnuchosphaera schenki BLOME

BLOME, 1983, p. 16, pl. 1, figs. 4, 12, 14, 17

BLOME, 1984, pp. 28-29, pl. 3, fig. 10

Capnuchosphaera simithorum BLOME

BLOME, 1983, p.17, pl. 1, figs. 1, 6, 9, 15

BLOME, 1984, p. 29, pl. 3, fig. 11

?*Capnuchosphaera* cf. *C. schenki* BLOME

YOSHIDA, 1986, pl. 12, fig. 2

Capnuchosphaera colemani BLOME Group

SUGIYAMA, 1997, p. 175, fig. 49-12

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Karpenission, Greece; Southwest and Central Japan; East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera concava DE WEVER, 1979

Plate 3, figures 6-7

Capnuchosphaera concava DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 82, pl. 6, figs. 13-15

DE WEVER, 1982b, pp. 151-152, pl. 3, figs. 8-9; pl. 6, fig. 1

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Karpenission, Greece; Sicily, Italy; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera constricta (KOZUR & MOCK, 1981)

Plate 3, figures 8-9

Sulovella constricta KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, pp. 77-78, pl. 64, figs. 2a, 2b

Capnuchosphaera cf. *constricta* (KOZUR & MOCK, 1981)

HALEMIC & GORICAN, 1995, pl. 2, fig. 11

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Westkarpats; Nortwest Croatia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera crassa YEH, 1990

Plate 3, figures 10-11

Capnuchosphaera crassa YEH

YEH, 1990, p. 8, pl. 1, figs. 8, 11-13, 18-19

YEH, 1992, p. 57, pl. 9, fig. 14

HALEMIC & GORICAN, 1995, pl. 2, fig. 12

Capnuchosphaera sp. aff. *C. crassa* YEH

YEH, 1990, p. 8, pl. 1, figs. 14-15; pl. 2, figs. 2-3

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Busuanga and Uson Islands, Philippines; Nortwest Croatia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera deweveri KOZUR & MOSTLER, 1979 emend. BLOME, 1983

Plate 3, figures 12-13

Capnuchosphaera triassica var. a DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, pp. 84-85, pl. 4, figs. 3-5

NAKASEKO & NISHIMURA, 1979, p. 76, pl. 7, fig. 4

Capnuchosphaera deweveri KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 75-76, pl. 10, figs. 4-7, pl. 12, fig. 1

DE WEVER, 1982, pp. 153-155, pl. 3, figs. 10, 11; pl. 4, figs. 1, 2

BLOME, 1983, p. 16, pl. 1, figs. 3, 8, 9, 16, 18

BLOME, 1984, p. 28, pl. 3, fig. 9

LAHM, 1984, pp. 81-82, pl. 14, fig. 7

YEH, 1990, p. 8, pl. 2, fig. 5; pl. 10, fig. 8

OTSUOKA, KAJIMA & HORI, 1992, pl. 3, fig. 8

AITA & SPORLI, 1994, pl. 6, fig. 3

Capnuchosphaera triassica DE WEVER

YAO, 1982, pl. 2, fig. 22

Range (this study): latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- middle Norian- ? late Norian.

Occurrence: Karpenission and Tourla Greece; Sicily, Italy; Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; Gostling and Grossreifling, Austria; Sothwest and Central Japan; Westkarpats; East Central-Oregon, USA; North Island, New Zeland; Busuanga Island, Philippines.

Capnuchosphaera lea DE WEVER, 1979

Plate 3, figure 14

Capnuchosphaera lea DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 83, pl. 3, figs. 1-5

DE WEVER, 1982b, pp. 155-156, pl. 4, figs. 3-6; pl. 6, figs. 3, 4, 10

YEH, 1990, pp. 8-9, pl. 1, figs. 2, 3, 7, 17; pl. 2, fig. 7

BRAGIN, 1991a, p. 78, pl. 5, figs. 17, 18.

SUGIYAMA, 1997, p. 175, fig. 27-13

Capnuchosphaera cf. *lea* DE WEVER

HALEMIC & GORICAN, 1995, pl. 2, figs. 14-15

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- early Norian(*E. abneptis* Con. Z.).

Occurrence: Sicily, Italy; Busuanga Island, Philippines; Far east Russia; Northwest Croatia; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera lenticulata PESSAGNO, 1979

Plate 4, figure 1

Capnuchosphaera lenticulata PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 173, pl. 7, figs. 1-3, pl. 9, fig. 2

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.)

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- late middle Norian- ? late Norian.

Occurrence: Baja California, Mexico; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera silviesensis BLOME, 1983 Group

Plate 4, figure 2

Capnuchosphaera silviesensis BLOME

BLOME, 1983, pp. 16-17, pl. 1, figs. 5, 11, 13, 19; pl. 11, fig. 3

BLOME, 1984, p. 29, pl. 3, fig. 13

Capnuchosphaera sockensis BLOME

BLOME, 1983, p. 17, pl. 2, figs. 2, 13, 14, 16

BLOME, 1984, p. 29, pl. 3, figs. 12

YOSHIDA, 1986, pl. 2, fig.1

?*Capnuchosphaera silviesensis* BLOME Group

SUGIYAMA, 1997, p.176, fig. 49-18

Range (this study): Late Triassic; early Norian (E.abneptis Con. Z.-*E. triangularis* Con. Z.)

Total Range (this study and published): Late Triassic; ? middle Carnian- early Norian (E.abneptis Con. Z.-*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Gifu Prefecture and ? Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnuchosphaera theloides DE WEVER, 1979
Plate 4, figure 3

Capnuchosphaera theloides DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, pp. 83-84, pl. 3, figs. 10-13

NAKASEKO & NISHIMURA, 1979, p. 75, pl. 7, figs. 1-3, pl. 12, fig. 6

DE WEVER, 1982b, pp. 157-158, pl. 5, figs. 5-8; pl. 6, fig. 2

YAO, 1982, pl. 2, fig. 23

YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 23

YOSHIDA, 1986, pl. 12, fig. 4

YEH, 1990, p. 9, pl. 2, fig. 13; pl. 3, fig. 12

BRAGIN, 1991a, pp. 77-78, pl. 5, figs. 14, 15

? HALEMIC & GORICAN, 1995, pl. 2, fig. 13

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: Karpenission, Greece; Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; Southwest and Central Japan; Busuanga Islands, Philippines; Sikhote-Alin, Fareast Russia;? Northwest Croatia.

Capnuchosphaera triassica DE WEVER, 1979
Plate 4, figures 4-5

Capnuchosphaera triassica DE WEVER

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER,1979, p. 84, pl. 3, figs. 14-19

NAKASEKO & NISHIMURA, 1979, p. 76, pl. 7, figs 5, 6

DE WEVER, 1982b, pp. 159-160, pl. 6, figs. 5, 6; pl. 7, figs. 1, 4

NON YAO, 1982, pl. 2, fig. 22 (=*Capnuchosphaera deweveri* KOZUR & MOSTLER)

NISHIZONO, OHISHI, SATO & MURATA, 1982, pl. 1, fig. 17

LAHM, 1984, p. 82, pl. 14, figs. 8, 9

SATO, MURATA & YOSHIDA, 1986, pl. 16, fig. 13

YEH, 1990, p. 9, pl. 2, figs. 9, 10, 16; pl. 3, figs. 5, 10, 14-15

YEH, 1992, p. 57, pl. 9, fig. 11

FUJII, HATTORI & NAKAJIMA, 1993, pl. 3, fig. 14

? HALEMIC & GORICAN, 1995, pl. 2, fig. 9

Capnuchosphaera n. sp. aff. *triassica* DE WEVER

KOZUR & MOSTLER, 1979, p. 75, pl. 10, figs. 3

Range (this study): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Karpenission, Greece; Sicily, Italy; Ispartacay Formation, Isparta, Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Turkey; Gostling and Grossreifling, Austria; South, Central and Southwest Japan; Busuanga and Uson Islands, Philippines; Northwest Croatia.

Capnuchosphaera tricornis DE WEVER, 1979
Plate 4, figures 6-7

Capnuchosphaera tricornis DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 85, pl. 4, figs. 6-10

DE WEVER, 1982b, pp. 161-162, pl. 6, figs. 5, 7; pl. 7, figs.5, 6; pl. 8, figs. 1-4

YOSHIDA, 1986, pl. 12, fig. 3

BRAGIN, 1991b, pl. 1, fig. 7; pl. 2, fig. 2

YEH, 1992, p. 57, pl. 9, fig. 12

HALEMIC & GORICAN, 1995, pl. 2, fig. 16

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- middle Norian.

Occurrence: Sicily, Italy; Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; Gifu Prefecture, Central Japan;

Fareast Russia; Uson Island, Philippines; Northwest Croatia.

Capnuchosphaera sp. A

Plate 4, figure 8

Brief Definition: Same as genus. Cortical shell large and double layered. Tumidispinae moderately long, shorter than the diameter of cortical shell. Spinal tunnel with undulated shape, it abruptly expanding after base then small depression present in its midway and again slightly expanding and contracting. Shape of the spinal tumor and spinal shaft unclear due to less material or so short.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	167
Length of tumidispinae	112

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Capnuchosphaera* sp. A differs from the other species of genus *Capnuchosphaera* DE WEVER by having tumidispinae with undulate surface.

Capnuchosphaera sp. B

Plate 4, figure 9

? *Sulovella* sp.

KOZUR & MOCK in KOZUR & MOSTLER, 1981, pl. 47, fig. 6

Brief Definition: Same as genus. Cortical shell spherical and double layered. Tumidispinae moderately long, spinal tunnel with two bulbous part, second one bigger than the first one. Situation of spinal tumor and tumidapores not clear due to less material. Spinal shaft short and circular in axial section.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	165
Length of tumidispinae	175

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: ?Westkarpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Capnuchosphaera* sp. B differs from *C. constricta* (KOZUR & MOCK) by possessing shorter tumidispinae, more bulbous spinal tunnel and shorter spinal shaft.

Genus ***Dicapnuchosphaera*** n. gen.

Type species: *Dicapnuchosphaera elegans* n. gen., n. sp.

Derivation of Name: According to its similarity to genus *Capnuchosphaera* DE WEVER but has two tumidispinae.

Description: Cortical shell spherical with two tumidispinae and one triradiate spine situated in the same plane. Cortical shell double layered, outer layer of variably sized polygonal pore frames with small nodes at pore frame vertices and inner layer with mainly polygonal smaller pore frames. Triradiate spines mainly short with three grooves and ridges pointed distally. Spinal tunnels hollow, smooth, circular to subcircular in axial section, spinal tumor sometimes prominent, swollen, triradiate in axial section always straight with three tumidapores. Spinal shaft solid and circular in axial section. Length of the tumidispinae mainly shorter than the diameter of cortical shell, rarely longer.

Included Species:

Dicapnuchosphaera elegans n. gen., n. sp.

Dicapnuchosphaera carterae n. gen., n. sp.

Dicapnuchosphaera sengori n. gen., n. sp.

Dicapnuchosphaera sp. A

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.)

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could be distinguished from the genus *Capnuchosphaera* DE WEVER by possessing two tumidispinae instead of three. *Dicapnuchosphaera* n. gen. differs from *Monocapnuchosphaera* n. gen. by having two

tumidispinae and one triradiate spine instead of one tumidispina and two triradiate spines.

Dicapnuchosphaera carterae n. gen., n. sp.
Plate 4, figures 10-13

Derivation of Name: This species is named for Dr. Elizabeth S. CARTER, Oregon, USA, in honour of her contributions to the study of late Triassic and early Jurassic Radiolarian Biostratigraphy.

Holotype: The specimen on plate 4, figure 10. Sample 98-UKT-48. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 26 specimens.

Description: Cortical shell large, spherical with two tumidispinae and one triradiate spine situated in the same plane. Cortical shell double layered with outer layer of meshwork consisting of large irregular polygonal pore frames with a small nodes at pore frame vertices, inner layer comprised of more regular and more uniform, polygonal (mainly trigonal and sometimes hexagonal) pore frames with small to medium size, mainly semicircular sometimes ellipsoidal pores. Triradiate spine shorter than those of tumidispinae and the diameter of cortical shell with three wide grooves and thin ridges, tapering distally, pointed. The length of two tumidispinae slightly shorter than diameter of cortical shell or about equal. Spinal tunnels moderately long, proximal part smooth and circular in axial section, expanding distally, become so bulbous at the distal end. Spinal tumor small with three elliptical tumidapores. Spinal shaft tapering distally and circular in axial section.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min	Max	Av.
Diameter of the cortical shell	200	180	200	193
Lengthof tumidispinae	167	167	170	168.5
Length of the triradiate spine	?	75	110	92.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Dicapnuchosphaera carterae* n. gen., n. sp. differs from *D. elegans* n. gen., n. sp. by having bulbous spinal tunnel. It can be distinguished from *D. sengori* n. gen., n. sp. by absence of three needle-like spines flanking from the base of spinal tumors.

Dicapnuchosphaera elegans n. gen., n. sp.
Plate 5, figures 1-2

Derivation of Name: From the Latin *elegans* = pretty.

Holotype: The specimen on plate 5, figure 1. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 17 specimens.

Description: Same as genus. Cortical shell large, spherical with two tumidispinae and one triradiate spine situated in the same plane. Cortical shell double layered with outer layer consists of large, polygonal (sometimes trigonal) pore frames and moderately to high nodes at some pore frame vertices. Inner layer with more regular, polygonal (mainly trigonal and hexagonal) pore frames and medium size ellipsoidal pores. Triradiate spine with three moderately deep grooves and ridges, tapering distally, pointed. The length of two tumidispinae slightly shorter than diameter of cortical shell or approximately equal. Spinal tunnels short to moderately long, slightly expanding in its midway, proximal part smooth, circular in axial section, distal portion presenting indentations in midway between tumidapores. Spinal tumors prominent with three well-developed triangular tumidapores. Spinal shaft short, slightly tapering distally, circular in axial section and about one of the third the length of given tumidispina.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	180	180	200	195
Lengthof tumidispinae	187	165	193	179.5
Length of the triradiate spine	87	65	87	76
Length of spinal shaft/ Length of tumidispina	0.28	0.26	0.31	0.28

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Dicapnuchosphaera elegans* n. gen., n. sp. has been compared to *D. carterae* n. gen., n. sp. under latter species. It differs from *D. sengori* n. gen., n. sp. by the absence of three needle-like spines flanking from the base of spinal tumors. It can be distinguished from *D.* sp. A by possessing shorter spinal shaft.

Dicapnuchosphaera sengori n. gen., n. sp.

Plate 5, figures 3-6

Derivation of Name: This species is named for Prof. Dr. A. M. C. SENGÖR, Istanbul Technical University, Istanbul, Turkey, in honour of his great contributions to the study of Turkish geology.

Holotype: The specimen on plate 5, figure 3. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 28 specimens.

Description: Same as genus. Cortical shell large, spherical and double layered. Outer layer with irregular polygonal pore frames with moderately high nodes at some pore frame vertices. Inner layer consists of polygonal (mainly trigonal) pore frames and small to medium size semicircular to ellipsoidal pores. Triradiate spine mainly longer than the other species of genus *Dicapnuchosphaera* n. gen., but still shorter than the diameter of cortical shell with relatively wide ridges and shallow grooves, tapering slightly distally, pointed. Tumidispinae short to moderately long, spinal tunnel smooth, slightly expanding in its midway and circular in axial section. Spinal tumor prominent with three well-developed, needle-like spine extends out outwardly at the base. Tumidapores big and triangular, spinal shafts short.

Measurements (μm):

(Based on the 6 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	173	167	200	187
Length of tumidispinae	153	125	155	142
Length of triradiate spine	?	65	147	102

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Dicapnuchosphaera sengori* n. gen., n. sp. has been compared to *D. carterae* n. gen., n. sp. and *D. elegans* n. gen., n. sp. under latter species.

***Dicapnuchosphaera* sp. A**

Plate 5, figure 7

Brief Definition: Same as genus. Cortical shell large, spherical and double layered. Triradiate spine moderately long with relatively wider ridges and shallow grooves. Tumidispinae long, spinal tunnel smooth, circular in axial section, width of it mainly constant. Spinal tumor slightly expanding with three circular tumidapores. Spinal shaft, solid, robust slightly tapering distally and about half of the given tumidispina.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	187
Length of tumidispinae	200
Length of triradiate spine	87
Length of spinal shaft/ Length of tumidispina	0.48

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Shape of the tumidispina of *Dicapnuchosphaera* sp. A has a great similarity to those of *Capnuchosphaera colemani* BLOME. It has been compared to *D. elegans* n. gen., n. sp. under latter species.

Genus ***Monocapnuchosphaera*** n. gen.

Type species: *Monocapnuchosphaera longispina* n. gen., n. sp.

Derivation of Name: According to its similarity to genus *Capnuchosphaera* DE WEVER but has one tumidispina instead of three.

Description: Cortical shell mainly moderate to large, spherical with a double layered pore frames structure. Outer layer of meshwork comprised of large mainly raised polygonal pore frames, inner layer usually comprised of smaller more uniform polygonal pore frames. Cortical shell with three symmetrically arranged primary spines situated in the same plane. Primary spines in different features, two of them triradiate, third one tumidispina. Triradiate spines mainly with wide grooves and thin ridges and length of them mainly shorter than the diameter of cortical shell. Spinal tunnels hollow, smooth and circular to subcircular in axial section. Spinal tumor sometimes prominent, swollen, triradiate in axial section, straight to strongly torsioned with three tumidapores. Spinal shaft solid and circular in axial section.

Included Species:

Monocapnuchosphaera longispina n. gen., n. sp.
Monocapnuchosphaera gracilis n. gen., n. sp.
Monocapnuchosphaera inflata n. gen., n. sp.
Monocapnuchosphaera subtornata n. gen., n. sp.
Monocapnuchosphaera subtornata dextra n. gen., n. sp., n. subsp.
Monocapnuchosphaera subtornata sinistra n. gen., n. sp., n. subsp.
Monocapnuchosphaera tornata n. gen., n. sp.
Monocapnuchosphaera sp. A
Monocapnuchosphaera sp. B

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could be distinguished from the genus *Capnuchosphaera* DE WEVER by possessing one tumidispina instead of three. It has been compared to *Dicapnuchosphaera* n. gen. under latter genus.

Monocapnuchosphaera gracilis n. gen., n. sp.
Plate 5, figures 8-9

Derivation of Name: From the Latin *gracilis*= delicate, slender.

Holotype: The specimen on plate 5, figure 8. Sample 98-UKT-59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 6 specimens.

Description: Same as genus. Cortical shell large, spherical with double layered pore frames. Outer layer comprised of large, polygonal, mainly regular pore frames. Large nodes present at some pore frame vertices. Inner layer with smaller, more uniform, mainly trigonal pore frames and semicircular to elliptical pores. Two moderately long triradiate spines straight, width of the ridge and grooves roughly equal, tapering distally, pointed. Tumidispina short, length of it roughly equals to the diameter of cortical shell. Spinal tunnel slightly expanding in its midway and circular to subcircular in axial section. Spinal tumor prominent with three circular tumidapores. Spinal shaft circular in axial section, spinal shaft one of the third of given tumidispina.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	187	130	187	158.5
Length of tumidispina	173	145	173	159
Length of triradiate spines	107	-	-	107

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.- *E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera gracilis* n. gen., n. sp. differs from both *M. inflata* n. gen., n. sp. and *M. longispina* n. gen., n. sp. by possessing shorter tumidispina and nodes on the cortical shell.

Monocapnuchosphaera inflata n. gen., n. sp.
Plate 5, figures 10-11

Derivation of Name: Due to its medially inflated tumidispina.

Holotype: The specimen on plate 5, figure 10. Sample 97-UKT-128. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 24 specimens.

Description: Same as genus. Cortical shell large, spherical with double layered pore frames. Outer layer comprised of large, irregular polygonal pore frames with small nodes at pore frame vertices. Inner layer of cortical shell with much smaller, mainly hexagonal and sometimes tetragonal pore frames with circular to elliptical pores in different size. Two short, triradiate spines straight with thin ridges and shallow, wide grooves, tapering distally. Tumidispina moderately long, spinal tunnel slightly expanding short after base then becomes constant in width and circular in axial section. Spinal tumor prominent and straight. Tumidapores again distinct and trigonal. Spinal shaft so short or absent.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max	Av.
Diameter of the cortical shell	200	185	200	192.5
Length of tumidispina	227	190	227	208.5
Length of triradiate spines	93	-	-	93

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera inflata* n. gen., n. sp. differs from *M. longispina* n. gen., n. sp. by having shorter tumidispina with bulbous medial part. It has been compared to *M. gracilis* n. gen., n. sp. under latter species. It can be differentiated from *M. subtornata* n. gen., n. sp. and *M. tornata* n. gen., n. sp. by possessing straight spinal tumor instead of slightly or highly twisted ones.

Monocapnuchosphaera longispina n. gen.,n. sp.
Plate 5, figures 12-15

Derivation of Name: Due to its long tumidispina.

Holotype: The specimen on plate 5, figure 12. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 22 specimens.

Description: Same as genus. Cortical shell moderate to large, spherical with double layered pore frames. Outer layer comprised of large polygonal irregular pore frames with small nodes at pore frame vertices. Inner pore frames more regular, polygonal (mainly trigonal, sometimes hexagonal) with small to medium size circular to elliptical pores. Two triradiate spines moderately long with thin ridges and wide grooves, slightly tapering distally. Tumidispina long, spinal tunnel hollow, smooth, straight, after base slightly expanding then slightly tapering before spinal tumor, circular in axial section. Spinal tumor straight, triradiate in axial section with three elliptical tumidapores. Spinal shafts mainly short, circular in axial section, tapering distally and pointed.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	200	180	220	197
Length of tumidispina	307	273	333	296.5
Length of triradiate spines	120	80	120	100

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera longispina* n. gen., n. sp. can be differentiated from *M. subtornata* n. gen., n. sp. and *M. tornata* n. gen., n. sp. by possessing straight spinal tumor instead of slightly or highly twisted ones. It has been compared to *M. gracilis* n. gen., n. sp. and *M. inflata* n. gen., n. sp. under latter species.

Monocapnuchosphaera subtornata n.gen.,n. sp.

Plate 6, figures 1-5

Derivation of Name: From the Latin *subtornata*= Not fully twisted.

Holotype: See subspecies.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: See subspecies.

Description: Same as genus. Cortical shell large, spherical with double layered pore frames. Outer layer comprised of large, irregular polygonal pore frames with small nodes at pore frame vertices. Inner layer of cortical shell with much smaller, mainly triangular and hexagonal pore frames with small to medium size circular to elliptical pores. Two very short triradiate spines straight with thin ridges and shallow, wide grooves, tapering distally and pointed. Tumidispina long, spinal tunnel slightly expanding short after base then slightly contracting or become constant in width, circular in axial section. Spinal tumor prominent, swollen with gentle sinistral or dextral torsion. Tumidapores elongated and elliptical. Spinal shaft short, tapering distally, pointed and circular in axial section.

Measurements (μm):

(See subspecies)

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It can be differentiated from *M. tornata* n. gen., n. sp. by having slightly twisted spinal tumor instead of highly twisted one. It has been compared to *M. gracilis* n. gen., n. sp., *M. inflata* n. gen., n. sp. and *M. longispina* n. gen., n. sp. under latter species.

Monocapnuchosphaera subtornata dextra

n. gen., n. sp., n. subsp.

Plate 6, figures 1-3

Derivation of Name: Due to its dextrally twisted spinal tumor.

Holotype: The specimen on plate 6, figure 1. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 13 specimens.

Description: Same as species. Spinal tumor prominent with gentle dextral torsion. Spinal shaft longer than those of the species of genus *Monocapnuchosphaera* n. gen.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	193	187	206	194.5
Length of tumidispina	293	267	306	288
Length of triradiate spines	80	80	200	124

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera subtornata dextra* n. gen., n. sp., n. subsp. differs from *M. subtornata sinistra* n. gen., n. sp., n. subsp. by possessing dextrally twisted spinal tumor instead of sinistrally one.

Monocapnuchosphaera subtornata sinistra n. gen., n. sp., n. subsp.

Plate 6, figures 4-5

Derivation of Name: Due to its sinistrally twisted spinal tumor.

Holotype: The specimen on plate 6, figure 4. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey. (See locality description).

Material: 21 specimens.

Description: Same as species. Spinal tumor prominent, swollen with gentle sinistral torsion.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	200	190	245	211
Length of tumidispina	267	267	320	292
Length of triradiate spines	67	65	67	66

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera subtornata sinistra* n. gen., n. sp., n. subsp. has been compared to *M. subtornata dextra* n. gen., n. sp., n. subsp. under latter subspecies.

Monocapnuchosphaera tornata n. gen., n. sp.

Plate 6, figures 6-7

Derivation of Name: From the Latin *tornatus* = twisted.

Holotype: The specimen on plate 6, figure 6. Sample 98-UKT-62. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 11 specimens.

Description: Same as genus. Cortical shell moderately large, spherical with double layered pore frames. Outer layer comprised of large, polygonal pore frames. Inner layer of cortical shell with much smaller mainly triangular pore frames. Two short triradiate spines straight with wide ridges and shallow grooves and slightly tapering distally. Tumidispina moderately long, spinal tunnel slightly expanding short after base then slightly contracting. Spinal tumor very prominent, swollen and strongly sinistrally twisted. Tumidapores large and elliptical. Spinal shaft short and triangular.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	167	167	190	180.5
Length of tumidispina	227	227	247	234
Length of triradiate spines	80	50	80	65

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.)

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera tornata* n. gen., n. sp. has been compared to *M. inflata* n. gen., n. sp., *M. longispina* n. gen., n. sp. and *M. subtornata* n. gen., n. sp. under latter species.

***Monocapnuchosphaera* sp. A**

Plate 6, figure 9

Brief Definition: Same as genus. Cortical shell large, spherical with possible double layered pore frames. Two triradiate spines straight, long, longer than the diameter of cortical shell and tumidispina, width of the grooves two times as ridges, tapering distally and pointed.

Tumidispina short, length of it smaller than diameter of cortical shell. Spinal tunnel roughly in same width and circular to subcircular in axial section. Spinal tumor prominent with three circular to elliptical tumidapores. Three triangular spines like projection extend out outwardly from the spinal tumor.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	167
Length of tumidispina	133
Length of triradiate spines	187

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera* sp. A is quite different from the other species of *Monocapnuchosphaera* n. gen. by possessing long, triradiate spines, short tumidispina and extra projections from spinal tumor. Shape of the tumidispina is similar to those of *Capnuchosphaera tricornis* DE WEVER and *Dicapnuchosphaera sengori* n. gen., n. sp.

Monocapnuchosphaera sp. B

Plate 6, figure 8

Brief Definition: Same as genus. Cortical shell large, spherical with possible double layered pore frames. Two triradiate spines straight, short with wide ridges and thin grooves, tapering distally and pointed. Tumidispina moderately long. Spinal tunnel slightly expanding in its midway and circular to subcircular in axial section. Spinal tumor less prominent with three circular tumidapores. Spinal shaft well-developed, circular in axial section, slightly tapering and pointed. Spinal shaft about half of the length of given tumidispina.

Measurements (μm):

(Based on the 2 specimens)

Diameter of cortical shell	140-150
Length of tumidispina	180-190
Length of triradiate spines	50

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Monocapnuchosphaera* sp. B could easily be differentiated from the other species of *Monocapnuchosphaera* n. gen. with its well-developed spinal shaft. Shape of the tumidispina similar to those of *Capnuchosphaera colemani* BLOME Group.

Genus ***Nodocapnuchosphaera*** n. gen.

Type species: *Nodocapnuchosphaera tuzcuae* n. gen., n. sp.

Derivation of Name: Due to its similarity to genus *Capnuchosphaera* DE WEVER but additional node occurrence on the surface of cortical shell.

Description: Cortical shell spherical, double layered, outer layer of meshwork consisting of large mainly irregular polygonal pore frames. Inner pore frames with mainly polygonal (mainly hexagonal and trigonal) smaller, more uniform with circular to semicircular pores, small to medium in size. Surface of the cortical shell mainly undulated due to occurrence of many large nodes. Nodes large separated from each other by moderately deep depressions, mainly uniform and regularly oriented. Three radially arranged tumidispinae extend out from cortical shell, situated in the same plane. Spinal tunnel short, wide and circular in cross-section. Spinal tumor prominent with three moderately large tumidapores. Spinal shaft long about two-third of given tumidispina and circular in cross section. Three long, needle-like spine branch off from spinal shaft before its termination, circular in cross section, tapering distally and slightly curved outwardly.

Included Species:

Nodocapnuchosphaera tuzcuae n. gen., n. sp.

Range (this study): Late Triassic; latest Carnian/ earliest Norian (*E. primitia* Con. Z.)-early Norian (Base of the *E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Nodocapnuchosphaera* n. gen. could be distinguished from the genus *Capnuchosphaera* DE WEVER by possessing many large nodes on cortical shell and shorter tumidispinae.

Nodocapnuchosphaera tuzcuae n. gen., n. sp.
Plate 6, figures 10-14

Derivation of Name: This species is named for M. Sc. Sevim TUZCU, General Directorate of Mineral Research and Exploration (MTA), Ankara, Turkey in honour of her contributions to the knowledge of coral biostratigraphy.

Holotype: The specimen on plate 6, figure 10. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Same as genus.

Measurements (μm):

(Based on the 7 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	220	207	233	217
Width of tumidispinae (proximally)	67	63	73	66
Length of tumidispinae	114	114	147	128

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (Base of the *E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Same as genus..

Genus ***Catoma*** BLOME, 1983

Catoma BLOME
BLOME, 1983, p. 20

Type Species: *Catoma geometrica* BLOME, 1983.

***Catoma* sp. A**
Plate 7, figure 1

Brief Definition: Same as genus. Cortical shell small, top and bottom slightly convex, sides slightly convex. Shell double layered. Proximal and medial portion of the spines long, porous, hexagonal in axial section, nodes on spines moderate in relief. Distal portion with short triradiate spine then solid short needle-like spine, circular in axial section, distally.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	85
Length of primary spines, including tips	110

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from *Catoma inedita* BLOME by having thicker primary spines and many pores on the surface of primary spines. It can be differentiated from *C.* sp. B in this study by possessing small cortical shell and shorter and thicker primary spines.

***Catoma* sp. B**
Plate 7, figure 2

Brief Definition: Same as genus. Cortical shell moderately big, top and bottom slightly convex, sides slightly convex. Shell double layered. Proximal and medial portion of the spines long, porous, hexagonal in axial section, nodes on spines moderate in relief. Distal part with short triradiate spine then solid short needle-like spine, circular in axial section, distally.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	107
Length of primary spines, including tips	180

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from *Catoma geometrica* BLOME by having longer porous part of primary spines. It has been compared to *C.* sp. A under latter species.

Genus ***Divatella*** KOZUR & MOSTLER, 1981

Divatella KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, pp. 75-76

Type Species: *Divatella spinosa* KOZUR & MOSTLER, 1981.

Divatella austriaca KOZUR & MOSTLER,1981

Plate 7, figure 3

Divatella austriaca KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 76, pl. 63, fig. 1

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Genus ***Icrioma*** DE WEVER, 1979

emend. BLOME, 1983 and emend. herein

Icrioma DE WEVER

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, pp. 32-33 emend. BLOME, 1983, p. 22

Type Species: *Icrioma tetrancistrum* DE WEVER, 1979.

Emended Definition: Cortical shell tetragonal in outline with four radially arranged primary spines occurring in tetrahedral plane. Spinal tumor with well-developed tri-tetra or even pentaradiate structure with three, four or five tumidapores.

Icrioma cruciformis n. sp.

Plate 7, figures 4, 7

Derivation of Name: Because of its cross like tetraradiate spinal tumor.

Holotype: The specimen on plate 7, figure 4. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Cortical shell large, top and bottom surface slightly convex; sides slightly convex. Outer layer of meshwork consisting of coarse, variable sized, raised polygonal pore frames with massive nodes at pore frame vertices; pores subcircular to polygonal in outline; inner layer consisting of coarse, polygonal pore frames. Tumidispinae moderately long, slightly shorter than the diameter of the cortical shell and in tetrahedral plane. Spinal tunnel moderately long, porous, circular to subcircular in axial section. Spinal tumor well-developed, tetradiadiate in axial section with four prominent tumidapores. Spinal shaft short, circular to subcircular in axial section. Subsidiary, circular spines at the end margin of primary spines rather longer than spinal shaft.

Measurements (µm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	100	93	100	96
Length of primary spines	80	80	90	84
Width of spinal tunnel	50	37	50	42

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Icrioma cruciformis* n. sp. differs from *I. tetrancistrum* DE WEVER by possessing tetraradiate spinal tumor instead of triradiate with well-developed four tumidapores instead of three.

Icrioma tetrancistrum DE WEVER, 1979

emend. herein

Plate 7, figures 5-6

Icrioma tetrancistrum DE WEVER

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 86, pl. 4, figs. 13-15

DE WEVER, 1982b, pp. 262-263, pl. 32, figs. 1-6

? KISHIDA & SUGANO, 1982, pl. 2, fig. 17

Emended Description: Cortical shell large, top and bottom surface convex; sides convex. Outer layer of meshwork consisting of coarse, variable sized raised polygonal pore frames with large massive nodes at pore frames vertices; inner layer consisting of coarse, polygonal pore frames and circular to subcircular pores. Tumidispinae moderately long, having a tendency to be slightly shorter than the diameter of the cortical shell and situated in tetrahedral plane. Spinal tunnel moderately long, porous, circular to subcircular in axial section. Spinal tumor well-developed, triradiate in axial section with three well-developed tumidapores. Spinal shaft long and circular to subcircular in axial section. Three subsidiary circular spines extend out also at the tip of primary spines.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- middle Norian.

Occurrence: Sicily, Italy; Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; ? Southwest Japan.

Icrioma sp. A

Plate 7, figure 8

Brief Definition: Cortical shell moderate, top and bottom surface slightly convex. Surface of the cortical shell could not be visible from the limited material. Tumidispinae moderately long and situated in tetrahedral plane. Spinal tunnel long, porous, circular to subcircular in axial section, spinal tumor well-developed, pentaradiate in axial section with five tumidapores. Shape of the spinal shaft not clear because of broken material.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	87
Length of primary spines	80
Width of spinal tunnel	37

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from the species of genus *Icrioma* DE WEVER by having pentaradiate spinal tunnel and five tumidapores.

Genus ***Paricrioma*** n. gen.

Type species: *Paricrioma deweveri* n. gen., n. sp.

Derivatio nominis: For the similarity to genus *Icrioma* DE WEVER.

Description: Cortical shell tetragonal in outline with four radially arranged primary spines situated in one plane (planiform), sometimes two of them slightly deviated. Surface of the cortical shell planiform to convex, sides vertical to convex. Shell structure as for family, composing of two layers of polygonal pore frames. Tumidispinae generally symmetrically, in some cases asymmetrically arranged. Spinal tunnel hollow, consisting of single layer of polygonal pore frames with nodes at vertices and circular to subcircular in outline. Spinal tumor moderately to well-developed, triradiate in axial section with three tumidapores. Spinal shaft moderately long to long and circular in axial section. Sometimes subsidiary spines also extend out at the tip of primary spines.

Included Species:

Paricrioma deweveri n. gen., n. sp.

Icrioma ? *cistella* CARTER, 1993

Icrioma praecipua BLOME, 1983

Icrioma transversa BLOME, 1983

Icrioma sp. A YEH, 1989

Icrioma ? sp. A CARTER, 1993

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.)- Rhaetian.

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)-Rhaetian.

Occurrence: Ispartacay Formation, Isparta, Yaylakuzdere and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey; East-Central Oregon, USA; British Columbia, Canada.

Remarks: *Paricrioma* n. gen. could be differentiated from *Icrioma* DE WEVER by possessing four primary spines situated in one plane instead of tetrahedral planes. *Paricrioma* n. gen. differs from *Catoma* BLOME by possessing tumidispinae. It also differs from *Weverella* KOZUR AND MOSTLER by having porous spinal tunnels instead of nonporous ones.

Paricrioma cistella (CARTER, 1993) n. comb.
Plate 7, figure 12

Icrioma ? *cistella* CARTER

CARTER, 1993, p. 47, pl. 3, figs. 13, 14.

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It is included into genus *Paricrioma* n. gen. due to its planar primary spines.

Paricrioma deweveri n. gen., n. sp.
Plate 7, figures 9-10

Icrioma sp. A

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 86, pl. 4, figs.18-20

DE WEVER, 1982a, pp. 263-264, pl. 33, figs. 1-4

Derivation of Name: This species is named for Prof. Dr. Patrick DE WEVER, Laboratorie National d'Historie Naturelle, Paris, France, in honour of his contributions to the study of Mesozoic Radiolaria.

Holotype: The specimen on plate 7, figure 9. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See the locality description).

Material: 4 specimens.

Description: With the character of genus. Cortical shell tetragonal in outline with four radially arranged primary spines situated in one plane. Cortical shell large, top and bottom surface slightly convex; sides again slightly convex. Outer layer of meshwork consisting of coarse, variable sized, raised polygonal pore frames (mainly trigonal and tetragonal) with massive nodes at pore frame vertices; pores subcircular in outline. Inner layer consisting of polygonal pore frames with circular to subcircular pores in different size. Tumidispinae mainly symmetrically arranged, sometimes slightly asymmetric, moderately long and thick. Spinal tunnel consisting of single layer pore frames with nodes at pore frame vertices, pores circular to elliptical, spinal tunnel circular to subcircular in outline. Spinal tumor triradiate in axial section, sometimes not regular and disturbed by secondary spines. Spinal shaft relatively short and circular in cross section. Subsidiary spines present at the tip of primary spines, mainly triangular in outline and tapering distally.

Measurements (μm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	100	84	100	92
Length of primary spines	100	77	100	88.5
Width of spinal tunnel	45	35	45	40

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from *Paricrioma transversa* (BLOME) by possessing well-developed spinal tumors, shorter spinal shaft and secondary spines extend out at the tip of primary spines.

Paricrioma* sp. aff. *P. deweveri n. gen., n. sp.
Plate 7, figure 11

aff. *Icrioma* sp. A

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 86, pl. 4, figs. 18-20

DE WEVER, 1982a, pp. 263-264, pl. 33, figs. 1-4

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: These forms differ from *Paricrioma deweveri* n. gen., n. sp. by possessing two tumidispinae slightly tilted and deviated while the other two stay planar.

Genus ***Weverella*** KOZUR & MOSTLER, 1979

Weverella KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 76

Type Species: *Weverella tetrabrachiata* KOZUR & MOSTLER, 1979.

Weverella tetrabrachiata KOZUR & MOSTLER, 1979

Weverella tetrabrachiata aspinosa KOZUR & MOSTLER, 1981
Plate 7, figure 13

Weverella tetrabrachiata aspinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 77, pl. 63, fig. 3

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

SUBFAMILY **SARLINAE** DE WEVER, 1982b

Genus ***Braginastrum*** n. gen.

Type species: *Braginastrum curvatus* n. gen., n. sp.

Derivation of Name: This species is named for Dr. Nikita Yu. BRAGIN, Geological Institute of Academy of Science, Moscow, Russia, in honour of his contributions to the study of Triassic Radiolaria, his kind personality and nice comments on this study.

Description: Cortical shell large, slightly compressed, hemispherical to lentil-shaped with outer layer comprised of coarse polygonal (mainly trigonal and hexagonal) pore frames with small nodes at vertices. Inner layer of cortical shell with smaller, polygonal (mainly pentagonal and hexagonal) pore frames and mainly circular and approximately uniform pores. Three long primary spines situated in the same plane proximally, triradiate with wide ridges and deep grooves, loosely twisted then curved to three different directions in their midway and become as needle-like spine, circular in cross section, tapering distally and pointed terminally.

Included Species:

Braginastrum curvatus n. gen., n. sp.

Range(this study): Late Triassic; latest Carnian /earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Braginastrum* n. gen. differs from genus *Sarla* PESSAGNO by possessing curved primary spines instead of a straight ones.

Braginastrum curvatus n. gen., n. sp.
Plate 8, figures 1-5, 7

Derivation of Name: According to curved primary spines.

Holotype: The specimen on plate 8, figure 1. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 34 specimens.

Description: Same as genus.

Measurements (µm):

(Based on the 6 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	108	95	110	102
Width of the spines (proximally)	35	30	45	36
Length of the primary spines	225	170	235	189

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Same as genus.

Genus ***Sarla*** PESSAGNO, 1979

Sarla PESSAGNO

PESSAGNO in PESSAGNO, FINCH AND ABBOTT, 1979, p. 174

Type Species: *Sarla prietoensis* PESSAGNO, 1979.

Sarla dumitricai (LAHM, 1984) n. comb.

Plate 8, figures 6, 10

Triactoma dumitricai LAHM

LAHM, 1984, p. 73, pl. 13, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Triassic; early Norian (*E. triangularis* Con. Z.).

Occurrence: Recaoro, Italy; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This species with double layered wall structure and twisted primary spines should belongs to genus *Sarla* PESSAGNO.

Sarla robusta n. sp.

Plate 8, figures 8-9

Derivation of Name: For its strong and thick primary spines.

Holotype: The specimen on plate 8, figure 8. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 11 specimens.

Description: Cortical shell large, spherical, double layered consisting of outer layer of variably size, massive, polygonal, elevated pore frames, inner with circular to polygonal pore frames. Primary spines short, thick and loosely twisted with relatively thin ridges and three wide grooves without distal circular spines. Length of the primary spines smaller than the diameter of cortical shell.

Measurements (µm):

(Based on the 2 specimens)

	HT	Min.	Max	Av.
Diameter of the cortical shell	170	150	170	160
Length of spines	125	100	125	112.5
Width of spine (proximally)	50	40	50	45
Max. width of spine	75	54	75	64.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Sarla robusta* n. sp. differs from *S. transita* (KOZUR & MOCK) by having shorter primary spines of which length is smaller than the diameter of the cortical shell. It can be distinguished also from *S. vetusta* PESSAGNO by possessing larger cortical shell and thicker primary spines.

Sarla transita (KOZUR & MOCK, 1981)

Plate 8, figures 11-12

Vinassaspongus transitus KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, pp. 69-70, pl. 64, figs. 1.a, b

Sarla transita (KOZUR & MOCK, 1981)

SUGIYAMA, 1997, pp. 186-187

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Westkarpats; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Sarla vetusta PESSAGNO, 1979

Plate 8, figure 13

Sarla vetusta PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 174-175, pl. 7, figs. 4, 6-7, 13-14

BLOME, 1984, p. 32

DONOFRIO, 1991, p. 209, pl. 3, fig. 3

SUGIYAMA, 1997, p. 187, fig. 50-10

Sarla sp. aff. *S. vetusta* PESSAGNO

BLOME, 1983, p. 19, pl. 3, figs. 4, 13, 17

BLOME, 1984, p. 32, pl. 4, fig. 4

Range (this study): Late Triassic; latest Carnian /earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian /earliest Norian (*E. primitia* Con. Z.)- late middle Norian- ? late Norian.

Occurrence: Baja California sur, Mexico; East-Central Oregon, USA; Aghderband, Iran; Mino terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Sarla vizcainoensis PESSAGNO, 1979

Plate 8, figure 14

Sarla vizcainoensis PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 175, pl. 7, figs. 8, 12

KISHIDA & SUGANO, 1982, pl. 2, figs. 13-14

BLOME, 1984, p. 32

Sarla cf. *vizcainoensis* PESSAGNO

BRAGIN, 1991a, p. 79, pl. 6, fig. 12

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- late middle Norian- ? late Norian.

Occurrence: Baja California, Mexico; Southwest Japan; Sahalin, Fareast Russia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **PATULIBRACHIIDAE** PESSAGNO, 1971 emend. BAUMGARTNER, 1980

SUBFAMILY **PATULIBRACCHIINAE** PESSAGNO, 1971 emend. BAUMGARTNER, 1980

Genus ***Bistarkum*** YEH, 1987

Bistarkum YEH

YEH, 1987, p. 42

Type Species: *Bistarkum rigidum* YEH, 1987.

Bistarkum* sp. aff. *B. ? cylindratum CARTER, 1993

Plate 9, figures 1-2

aff. *Bistarkum ? cylindratum* CARTER

CARTER, 1993, pp. 79-80, pl. 10, figs. 1, 18

Range (this study): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This form differs from *B. ? cylindratum* CARTER by possessing wider and prominent distal end and slightly longer test.

Genus ***Crucella*** PESSAGNO, 1971

Crucella PESSAGNO

PESSAGNO, 1971, p. 52

Type Species: *Crucella messinae* PESSAGNO, 1971.

Crucella tenuis n. sp.

Plate 9, figures 3-4

Derivation of Name: From the Latin *tenuis*= fragile, delicate.

Holotype: The specimen on plate 9, figure 3. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 7 specimens.

Description: Test medium, cruciform with no special feature at the centre. Rays equal in length, thick, straight, uniform and circular in cross section. Outer layer (meshwork) is mainly of Pseudoaulophacid type. Pore frames on rays on linear arrangement. Termination of the arms blunt with rudimentary spine.

Measurements (μm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Length of rays	150	15	155	152.5
Width of rays	60	60	65	62.5
Length of spine (at tips)	15	-	-	15

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Crucella tenuis* n. sp. could easily be distinguished from the other species of genus *Crucella* PESSAGNO by virtue of straight, uniform arms and rudimentary spine at tips.

Genus ***Triassocrucella*** KOZUR, 1984b

Triassocrucella KOZUR

KOZUR, 1984b, pp. 33-34

Type species: *Hagiastrum baloghi* KOZUR & MOSTLER, 1978.

Triassocrucella baloghi (KOZUR & MOSTLER, 1978)

Plate 9, figure 5

Hagiastrum baloghi KOZUR & MOSTLER

KOZUR & MOSTLER, 1978, p. 144, pl. 2, figs. 1-5

Crucella baloghi (KOZUR & MOSTLER, 1978)

LAHM, 1984, p. 90, pl. 16, fig. 7

KOLAR-JURKAVESK, 1990, pp. 81-82, pl. 10, fig. 1

Triassocrucella baloghi (KOZUR & MOSTLER, 1978)

KOZUR, 1984b, p. 33, pl. 1, figs. 3, 6

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Göstling,Grossreifling, Austria; Slovenia; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Triassocrucella triassica (KOZUR & MOSTLER, 1978)

Plate 9, figure 6

Hagiastrum triassicum KOZUR & MOSTLER

KOZUR & MOSTLER, 1978, p. 146, pl. 1, fig. 4; pl.2, fig. 11, 12?; pl. 3, fig. 2

Crucella triassica (KOZUR & MOSTLER, 1978)

LAHM, 1984, p. 91, pl. 16, fig. 9

Triassocrucella triassica (KOZUR & MOSTLER, 1978)

KOZUR, 1984b, p. 33

Range(this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Göstling, Austria; ?Queen Charlotte Islands, British Columbia, Canada;

Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Paronaella*** PESSAGNO, 1971 emend. BAUMGARTNER, 1980

Paronaella PESSAGNO
PESSAGNO, 1971, pp. 46-47
emend. BAUMGARTNER, 1980, p. 300
Sontonaella YEH
YEH, 1987, p. 44

Type species: *Paronaella solanoensis* PESSAGNO, 1971.

Paronaella claviformis (KOZUR & MOSTLER, 1978) n. comb.
Plate 9, figure 7

Rhopalodictyum claviformis KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 147, pl. 3, figs. 13-14

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad Subz.)- late Triassic; middle Carnian.

Occurrence: Grossreifling, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Paronaella fragilis (KOZUR AND MOSTLER, 1978)
Plate 9, figure 8

Rhopalodictyum fragilis KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 148, pl. 5, fig. 4
Paronaella fragilis (KOZUR & MOSTLER, 1978)
LAHM, 1984, p. 89, pl. 16, fig. 3

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Grossreifling, Austria, Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Paronaella glaber (KOZUR & MOSTLER, 1978) n. comb.
Plate 9, figure 10

Rhopalodictyum glaber KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 148, pl. 3, fig. 15

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad Subz.)- late Triassic; middle Carnian.

Occurrence: Grossreifling, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Paronaella norica KOZUR & MOCK, 1981
Plate 9, figures 9, 11

Paronaella norica KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 61, pl. 46, fig. 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Occurrence: Westkarpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Paronaella* sp. aff. *P. nudum (KOZUR & MOSTLER, 1978) n. comb.
Plate 10, figure 1

aff. *Rhopalodictyum nudum* KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 149, pl. 3, fig. 19

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: This form differs from the holotype by having wider arms.

Paronaella pacofiensis CARTER, 1993
Plate 10, figure 2

Sontonella sp. A
YEH, 1992, p. 62, pl. 2, fig. 8
Paronaella pacofiensis CARTER
CARTER, 1993, pp. 81-82, pl. 10, fig. 5
SUGIYAMA, 1997, p. 184, fig. 50-15

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Uson Island, Philippines; Queen Charlotte Islands, British Columbia, Canada; Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Paronaella reiflingensis (KOZUR & MOSTLER, 1978)
Plate 10, figure 3

Rhopalodictyum reiflingensis KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 150, pl. 3, fig. 17
Paronaella reiflingensis (KOZUR & MOSTLER, 1978)
LAHM, 1984, p. 88, pl. 16, fig. 1

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Paronaella trammeri (KOZUR & MOSTLER, 1978)
Plate 10, figure 4

Rhopalodictyum trammeri KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 152, pl. 1, figs. 3, 8; pl. 3, figs. 8-11, 16?
Paronaella trammeri (KOZUR & MOSTLER, 1978)
KOZUR & MOSTLER, 1981, p. 61

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: Göstling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Paronaella* sp. aff. *P. yaogusensis CARTER, 1993
Plate 10, figure 5

aff. *Paronaella yaogusensis* CARTER
CARTER, 1993, p. 83, pl.10, figs. 4, 17

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This form differs from holotype of *Paronaella yaogusensis* CARTER in having shorter and broader arms proximally otherwise identical.

***Paronaella* sp. A**
Plate 10, figure 6

Brief definition: Test large with thin rays. Rays long, circular in cross section, ray tips flattened and elliptical with a 3 or 4 short spines.

Measurements (μm):
(Based on the 1 specimen)

Length of rays	233
Width of rays at base	60
Max. width of ray tips	133

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: *Paronaella* sp. A differs from the other species of genus *Paronaella* PESSAGNO by possessing flattened ray tips with short spines.

SUBFAMILY **NATRAGLIINAE** KOZUR, 1984a

Genus ***Natraglia*** PESSAGNO, 1979

Natraglia PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 171-172

Type Species: *Natraglia liminosa* PESSAGNO, 1979.

Natraglia unica PESSAGNO, 1979

Plate 10, figure 7

Natraglia unica PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 172, pl. 6, fig. 7

DE WEVER, 1982b, pp. 265-266, pl. 33, fig. 6

KOZUR, 1984a, pl. 2, fig. 2

GORICAN & BUSER, 1990, p. 148, pl. 1, fig. 6

Range (this study): late Triassic; early Norian (*E. abneptis* Con. Z.- *E. triangularis* Con. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian- late Triassic; late middle Norian.

Occurrence: Baja California Sur, Mexico; Sperchios, Greece; Mokronog, Slovenia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **PARATRIASSOASTRIDAE** KOZUR & MOSTLER,1981

Genus ***Paratriassoastrum*** KOZUR & MOSTLER,1981

Paratriassoastrum KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 63

Type Species: *Paratriassoastrum austriacum* KOZUR & MOSTLER, 1981.

Paratriassoastrum cordevolicum KOZUR & MOSTLER,1981

Plate 10, figure 8

Paratriassoastrum cordevolicum KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 64, pl. 47, figs. 1, 2

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Paratriassoastrum omegaense CARTER, 1993

Plate 10, figures 10-11

Paratriassoastrum omegaense CARTER

CARTER, 1993, p. 78, pl. 11, figs. 4, 7, 8, 14, 19

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

***Paratriassoastrum* sp. A**

Plate 10, figure 9

Brief definition: Test as with genus. Four rays of test long. Central shell small. Rays uniform in width at the base, tips flattened, enlarged and elliptical without secondary spines.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	87
Length of rays	240
Width of rays at base	73
Max. width of ray tips	137

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from *Paratriassoastrum omegaense* CARTER by having enlarged and flattened ray tips.

Paratriassoastrum sp. B

Plate 10, figure 12

Paratriassoastrum sp. B

CARTER, 1993, p. 79, pl. 11, figs. 15, 18

Brief definition: Small form with moderately large central shell and short rays terminated with strong, triradiate spine. Rays approximately equal in length to diameter of central shell (Carter, 1993)

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	90
Length of rays	100
Width of rays at base	75
Max. width of ray tips	85

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: Specimen from Dikmetas Measured Section is slightly wider at the base of rays and without triradiate spines (broken?).

FAMILY **PANTANELLIIDAE** PESSAGNO, 1977 emend. PESSAGNO AND BLOME,1980

SUBFAMILY **CAPNODOCINAE** PESSAGNO,1979 emend. BLOME, 1983

Genus *Capnodoce* DE WEVER,1979 emend. PESSAGNO,1979 emend. BLOME, 1983

Capnodoce DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 21

emend. PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 175-176

emend. BLOME, 1983, p. 23

Type species: *Capnodoce anapates* DE WEVER, 1979.

Capnodoce anapates DE WEVER, 1979

Plate 11, figure 1

Capnodoce anapates DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 81, pl. 2, figs. 5-7

NAKASEKO & NISHIMURA, 1979, p. 75, pl. 6, figs. 3-5

BAUMGARTNER, 1980, pl. 1, fig. 5, 6

DE WEVER, 1982b, pp. 141-143, pl. 2, figs. 10-13

KISHIDA & SUGANO, 1982, pl. 2, fig. 7

NISHIZONO, OHISHI, SATO & MURATA, 1982, pl.1, fig. 16

NISHIZONO & MURATA, 1983, pl. 2, fig. 10

YOSHIDA, 1986, pl. 10, figs. 9, 10

SATO, MURATA & YOSHIDA,1986, fig. 16-9

BRAGIN, 1986, pl. 1, fig. 2

BRAGIN, 1991a, p. 83, pl. 6, figs. 8, 9.

HALEMIC & GORICAN, 1995, pl. 2, figs. 6-7

? SUGIYAMA, 1997, p. 175, fig. 27-15

Capnodoce sp. aff. *C. anapates* DE WEVER

BLOME, 1983, p. 23, pl. 8, figs. 3, 10, 11, 18; pl. 11, figs. 8, 15

Capnodoce sp. aff. *C. anapates* DE WEVER

YEH, 1990, p. 14, pl. 14, fig. 3

Range (this study): Late Triasic; early Norian (*E. abneptis* Con. Z.)

Total Range (this study and published): Late Triassic; late Carnian- late Norian.

Occurrence: Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; Southwest and Central Japan; East-Central Oregon, USA; Sikhote-Alyn, Far east Russia; Busuanga Island, Philippines; Northwest Croatia.

Capnodoce crystallina PESSAGNO, 1979 Group

Plate 11, figures 2-3

Capnodoce crystallina PESSAGNO

PESSAGNOinPESSAGNO, FINCH & ABBOTT, 1979, p. 176, pl.1, figs. 1-3

BLOME, 1984, p. 34

SATO, MURATA & YOSHIDA, 1986, fig. 16. 11-12

Capnodoce antiqua BLOME

BLOME, 1983, p. 24, pl. 5, figs. 4, 12, 17

BLOME, 1984, p. 33, pl. 4, fig. 6

YOSHIDA, 1986, pl. 10, figs. 4, 5

BRAGIN, 1986, pl. 2, fig. 1

BRAGIN, 1991a, p. 83, pl. 6, fig. 10

Capnodoce cf. *antiqua* BLOME

KNIPPER, SATIAN & BRAGIN, 1997, pl. 1, fig. 2

Capnodoce crystallina PESSAGNO Group

SUGIYAMA, 1997, p. 175, fig. 49-17

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.)

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Baja California Sur, Mexico; Southwest and Central Japan; East-Central Oregon, USA; Far east Russia; Sevan-Akera, Lesser Caucasus; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnodoce extenta BLOME, 1983 Group

Plate 11, figures 4-5

Capnodoce extenta BLOME

BLOME, 1983, pp. 25-26, pl. 6, figs. 3, 7, 9, 17

BLOME, 1984, p. 34, pl. 4, fig. 10

Capnodoce miniscula BLOME

BLOME, 1983, p. 32, 34, pl. 7, figs. 5, 6, 13, 19; pl. 8, figs. 1, 9, 13

BLOME, 1984, p. 35, pl. 4, fig. 16

YOSHIDA, 1986, pl. 10, fig. 2

YEH, 1990, p. 14, pl. 15, fig. 2

Capnodoce sinuosa BLOME

BLOME, 1983, p. 34, pl. 8, figs. 2, 7, 8, 17; pl. 11, fig. 7

BLOME, 1984, p. 35, pl. 4, fig. 17

Capnodoce sp. cf. *C. extenta* BLOME

YEH, 1989, p. 55, pl.10, fig. 14

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Central Japan; Busuanga Island, Philippines; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It includes forms which have cortical shell size 106-128 μm and length of arms varies from 130 to 196 μm.

Capnodoce longibrachium n. sp.

Plate 11, figures 6-9

Capnodoce serisa DE WEVER

KOZUR & MOSTLER, 1981, pl. 63, fig. 2

Derivation of Name: From the Latin *longibrachium*= long arm.

Holotype: The specimen on plate 11, figure 6. Sample 96-UKT-672. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 100 specimens.

Description: Cortical shell spherical with three prominent primary spines. Meshwork of cortical shell consisting of relatively massive, large, hexagonal to polygonal pore frames with massive nodes at vertices, nodes high in relief. Five to six frames visible on top and bottom surfaces along an axis in line with axis of primary spines. Three straight primary spines situated in one plane mainly equal in length sometimes one of them a little bit longer than the others, thick, symmetrically arranged, long and circular in axial section. Their width increases distally and terminates with long triradiate part, pointed distally.

Measurements (μm):
(Based on the 8 specimens)

	HT	Min.	Max.	Av.
Diameter of cortical shell	127	127	140	137
Length of spines (without triradiatepart)	180	140	180	159
Width of the spines at the proximal part	40	33	47	40
Length of three bladed part	73	60	100	75
Width of the spines at the distal part	54	47	60	54
Total length of spines	253	200	273	235.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.- base of the *E triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z- base of the *E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *C. longibrachium* n. sp. differs from *C. extanta* PESSAGNO Group by possessing longer and thicker primary spines and stronger, longer and more distinctive triradiate tips. It can be distinguished from *Capnodoce serisa* DE WEVER by having distally expanding primary spines instead of contracting ones.

Capnodoce media BLOME, 1983
Plate 11, figure 10

Capnodoce media BLOME

BLOME, 1983, p. 32, pl. 7, figs. 4, 10, 12, 18

BLOME, 1984, p. 35, pl. 4, fig. 15

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Capnodoce sp. cf. *C. minuta* YEH, 1989
Plate 11, figure 11

cf. *Capnodoce minuta* YEH

YEH, 1989, pp. 55-56, pl. 11, figs. 5, 9

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Broken primary spines does not allow the identification of form. Both cortical shell and one primary spine have resemblance to those of *C. minuta* YEH.

Capnodoce serisa DE WEVER, 1979
Plate 11, figure 12-13

Capnodoce serisa DE WEVER

DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 82, pl. 2, figs. 9-12 **NON** pl. 2, fig. 8 (=*Loffa* sp.)

NAKASEKO & NISHIMURA, 1979, p. 75, pl. 6, figs. 1, 2

NON KOZUR & MOSTLER, 1981, pl. 63, fig. 2 (=*Capnodoce longibrachium* n. sp.)

DE WEVER, 1982b, pp. 143-145, pl. 3, figs. 1-3

YAO, 1982, pl. 2, fig. 24

YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 22

KISHIDA & SUGANO, 1982, pl. 2, fig. 6

SATO, NISHIZONO & MURATA, 1982, pl. 2, fig. 6

NISHIZONO & MURATA, 1983, pl. 2, fig. 9

SATO, MURATA & YOSHIDA,1986, fig. 16-10

SUGIYAMA, 1997, p. 175, fig. 49-16

Capnodoce fragilis BLOME

BLOME, 1983, p. 26, pl. 6, figs. 4, 10, 18; pl. 11, fig. 5

BLOME, 1984, p. 34, pl. 4, fig. 11

YOSHIDA, 1986, pl. 10, fig. 6

CARTER, ORCHARD & TOZER, 1990, pl. 1, fig. 10

CARTER, 1991, p. 199, pl. 1, figs. 1, 6

YEH & CHENG, 1996, pl. 10, figs. 1, 5

Range (this study): Late Triassic; early Norian (Top of the E abneptis Con. Z.- *E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (Top of the E abneptis Con. Z.)- late Norian.

Occurrence: Sicily, Italy; Ispartacay, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; Southwest and Central Japan; East-Central Oregon, USA; Queen Charlotte Islands, British Columbia, Canada; Busuanga Island, Philippines

Genus ***Loffa*** PESSAGNO, 1979

Loffa PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 177

Type species: *Loffa mulleri* PESSAGNO, 1979.

Loffa mulleri PESSAGNO, 1979

Plate 12, figure 1

Loffa mulleri PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 177, pl. 2, figs. 1-6, 8, 14, 15

DE WEVER, 1982b, pp. 147-148, pl. 3, figs. 4, 5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.)- ? late middle Norian

Occurrence: Baja California Sur, Mexico; Sicily, Italy; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Loffa vesterensis BLOME, 1983

Plate 12, figures 2-3

Loffa vesterensis BLOME

BLOME, 1983, pp. 38, 40, pl. 9, figs. 7, 11, 14, 19, 20; pl. 11, figs. 12, 13

BLOME, 1984, p. 36, pl. 5, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East- Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

***Loffa* sp. A**

Plate 12, figure 4

Brief Definition: Cortical shell moderate in size and circular in outline. Meshwork consisting of mixture of large, pentagonal and hexagonal pore frames (predominantly hexagonal) with medium nodes at pore frame vertices. Bars of pore frames relatively thick both in Y and Z directions. Primary spines moderately long, straight, wide with undulations and circular to subcircular in axial section. No distal end present.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	100
Max. length of primary spines	790

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from *Loffa vesterensis* BLOME by having more pores on cortical shell, thicker and undulated primary spines.

Genus ***Renzium*** BLOME, 1983

Renzium BLOME

BLOME, 1983, p. 40

Type Species: *Renzium webergorum* BLOME, 1983.

Renzium adversum BLOME, 1983
Plate 12, figure 5

Renzium adversum BLOME
BLOME, 1983, pp. 40, 42, pl. 10, figs. 1, 6, 7, 12
BLOME, 1984, p. 36, pl. 5, fig. 2

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Renzium tricarinatum n. sp.
Plate 12, figures 6-7

Derivation of Name: Due to its well-developed triradiate distal end.

Holotype: The specimen on plate 12, figure 6. Sample 98-UKT-48. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 5 specimens.

Description: Test as with genus. Cortical shell small to moderately big, circular to subcircular in outline, meshwork consisting of mixture of pentagonal to hexagonal (predominantly hexagonal) pore frames with massive nodes at pore frame vertices. Bars of pore frames narrow in Y direction, wide in Z direction. Five pore frames visible on top and bottom surfaces along an axis in line with the polar spines. Primary spines quite long, thin, tubular, unequal, slightly expanding in its mid way then mainly constant in width. Three moderately long triradiate spines with wide grooves and thin ridges present at distal end, tapering distally and pointed.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	120	120	137	128.5
Length of short primary spines (incl. triradiate part)	200	175	200	187.5
Length of long primary spines (incl. triradiate part)	213	193	213	203
Max. width of primary spines	47	40	47	43.5

Range (this study): Late Triassic; latest Carnian /earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Renzium tricarinatum* n. sp. differs from *R. adversum* BLOME by possessing larger cortical shell and longer primary spines. Furthermore, first is different from the latter by having primary spines unequal and expanding in its middle part (instead of equal and uniform primary spines).

***Renzium* sp. A**
Plate 12, figure 8

Description: Test as with genus. Cortical shell large, circular in outline; meshwork consisting of large pentagonal and hexagonal pore frames with massive nodes at the pore frames vertices, nodes moderate in relief. Bars of pore frames relatively wide in both Y and in Z directions. Six pore frames visible on top and bottom surfaces along an axis in line with the polar spines. Primary spines moderately long, expanding medially and slightly tapering distally.

Measurements (μm):
(Based on the 1 specimen)

Diameter of cortical shell	120
Length of short primary spines (including triradiate part)	92
Length of long primary spines (including triradiate part)	108
Max. width of primary spines	40

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Renzium* sp. A differs from *R. adversum* BLOME by having larger cortical shell and shorter spines, which is not uniform in width. It is also distinguished from the *R. webergorum* BLOME by possessing more spherical cortical shell, relatively longer primary spines tapering distally and proximally instead of continuos distally tapering ones.

Renzium sp. B

Plate 12, figure 9

Brief Definition: Test as with genus. Cortical shell small, subcircular to slightly elliptical in outline, meshwork consisting of moderately large, pentagonal and hexagonal (predominantly pentagonal) pore frames. Bars of pore frames relatively thin in Y and wide in Z directions. Six to seven pore frames visible on top and bottom surfaces along an axis in line with the polar spines. Primary spines moderately long, unequal increasing in width distally. Distal end without triradiate spines.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	100
Length of short primary spines (including triradiate part)	110
Length of long primary spines (including triradiate part)	150
Max. width of primary spines	60

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Renzium* sp. B differs from the other species of genus *Renzium* BLOME by having much pores on cortical shell and so expanding primary spines.

Renzium sp. C

Plate 12, figure 10

Description: Test as with genus. Cortical shell small, spherical in outline; meshwork consisting of large pentagonal and hexagonal pore frames with massive nodes at the pore frames vertices, nodes high in relief. Bars of pore frames relatively thin in Y and wide in Z directions. Six pore frames visible on top and bottom surfaces along an axis in line with the polar spines. Primary spines moderately long, expanding distally without triradiate spines at tips.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	90
Length of short primary spines (including triradiate part)	140
Length of long primary spines (including triradiate part)	170
Max. width of primary spines	50

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Renzium* sp. C differs from *R. adversum* BLOME by virtue of smaller cortical shell and shorter spines which is not uniform in width, slightly expanding distally.

SUBFAMILY **PANTANELLINAE** PESSAGNO, 1977

Genus ***Betraccium*** PESSAGNO, 1979

Betraccium PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 177-178

Type species: *Betraccium smithi* PESSAGNO, 1979.

Betraccium deweveri PESSAGNO & BLOME, 1980

Plate 12, figures 11-12

Betraccium deweveri PESSAGNO & BLOME

PESSAGNO & BLOME, 1980, pp. 230-231, pl. 1, figs. 1, 2, 5-8, 13, 14
BLOME, 1984, pp. 37-38, pl. 5, figs. 6, 7, 13, 20
YOSHIDA, 1986, pl. 13, figs. 6-9
BRAGIN, 1986, pl. 1, fig. 5
SATO, MURATA & YOSHIDA,1986, fig. 16, no. 16
SPORLI & AITA, 1988, pl. 1, fig. 4
BLOME, MOORE, SIMES & WATTERS, 1987, pl. 1, fig.11
CHENG, 1989, p. 145, pl. 11, figs. 8, 9, 16 **NON** pl. 8, fig. 8
BRAGIN, 1991a, p. 84 , pl. 7, figs. 13, 14
YEH, 1992, p. 59, pl. 1, figs. 9, 13, 14
CARTER, 1993, p. 58, pl. 6, fig. 1
BRAGIN & TEKIN, 1996, pl. 1, fig. 6
YEH & CHENG, 1996, p. 6, pl. 2, fig. 3
SUGIYAMA, 1997, p. 175, fig. 50-22

Range (this study): Late Triassic; late Norian.

Total Range (this study and published): Late Triassic; late Norian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Central Japan; Kawakawa Bay, New Zealand; Uson and Busuanga Islands, Philippines; Fareast Russia; Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey.

Betraccium inornatum BLOME, 1984

Plate 12, figure 13

Betraccium inornatum BLOME
BLOME, 1984, p. 38, pl. 5, figs. 9, 12, 17, 19
BLOME, REED & TAILLEUR, 1989, pl. 33.2, fig. 14
CARTER, 1993, p. 58, pl. 6, figs. 3, 8
Betraccium sp. aff. *B. inornatum* BLOME
CARTER, 1993, p. 59, pl. 6, figs. 4, 7, 9, 12
Betraccium sp. cf. *B. inornatum* BLOME
CARTER, 1993, p. 59, pl. 6, figs. 13

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Alaska, USA; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Betraccium perilense CARTER, 1993

Plate 12, figures 14-15

Betraccium sp. C
CHENG,1989, p. 145, pl. 11, fig. 6
Betraccium sp. B
YEH, 1992, p. 60, pl. 1, fig. 11
Betraccium perilense CARTER
CARTER, 1993, p. 61, pl. 6, figs. 5, 6

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Uson Island, Philippines; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Betraccium sp. A

Plate 13, figure 1

Brief Definition: Cortical shell subsphaerical in outline with a large, predominantly pentagonal pore frames having relatively well-developed nodes at pore frame vertices. Bars of pore frames thin in Y direction, thick in Z direction. 5-6 pore frames visible on the top and bottom surface along axis in line with axis of primary spines. Primary spines triradiate in axial section, solid, in medium size, straight, symmetric, equal and terminating with a sharp point, tapering both proximally and distally. Length of spines slightly shorter than the diameter of the cortical shell.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	117
Length of spines	103

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from the other species of genus *Betraccium* PESSAGNO with medially expanding primary spines.

Betraccium sp. B

Plate 13, figure 2

Brief Definition: Cortical shell small, subsphaerical in outline with a large pore frames. Bars of pore frames thin in Y direction, thick in Z direction. Five to six pore frames visible on the top and bottom surface along axis in line with axis of primary spines. Primary spines triradiate in axial section, solid, in medium size, straight, symmetric, equal and terminating with a sharp point, tapering distally. Length of spines slightly shorter than the diameter of the cortical shell.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	77
Length of spines	73

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Remarks: It differs from *Betraccium* sp. A by possessing not elevated pore frames and continuously tapering primary spines instead of medially expanding ones.

Genus *Cantalum* PESSAGNO, 1979

Cantalum PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 178

Type Species: *Cantalum holdsworthi* PESSAGNO, 1979.

Cantalum alium BLOME, 1984

Plate 13, figure 3

Cantalum alium BLOME

BLOME, 1984, p. 39, pl. 6, figs. 1, 12, 15, 16, 17

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Cantalum sp. A

Plate 13, figure 4

Cantalum sp. A

CARTER, 1993, p. 64, pl. 7, fig. 20

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus *Gorgansium* PESSAGNO & BLOME, 1980

Gorgansium PESSAGNO & BLOME

PESSAGNO & BLOME, 1980, p. 234

Type species: *Gorgansium silviesense* PESSAGNO & BLOME, 1980.

Gorgansium thayeri YEH, 1989

Plate 13, figure 5

Gorgansium thayeri YEH

YEH, 1989, pp. 60-61, pl. 7, fig. 12

Gorgansium sp. aff. *G. thayeri* YEH

YEH, 1989, p. 61, pl. 7, fig. 11

Gorgansium sp. aff. *G. thayeri* YEH

BLOME & REED, 1995, p. 62, pl. 2, fig. 25

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; ?early Carnian- latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: East-Central Oregon and North-Central Nevada, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Gorgansium sp. A

Plate 13, figure 6

Brief Definition: Cortical shell spherical in outline consisting of large hexagonal and

pentagonal pore frames, moderately thin in Y direction and thick in Z direction. Six to seven pores visible on the top and bottom surface along an axis of primary spines. Primary spines unequal and slightly asymmetrically arranged, two shorter spines situated closely. All three spines triradiate in axial section with wide ridges and thin grooves. Diameter of the cortical shell in all cases longer than the length of given primary spines.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	123
Length of long spine	107
Length of medium spine	90
Length of short spine	70

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Gorgansium* sp. A differs from *G. beaverense* YEH and *G. thayeri* YEH by possessing longer primary spines, larger cortical shell and more porous cortical shell. It can be distinguished from *G. richardsoni* PESSAGNO & BLOME by having twisted spines instead of straight ones.

Gorgansium sp. B

Plate 13, figure 7

Brief Definition: Cortical shell subsphaerical in outline consisting of large hexagonal and pentagonal pore frames thin in Y direction and thick in Z direction. Six pores visible on the top and bottom surface along an axis of primary spines. Primary spines unequal and slightly asymmetrically arranged, two shorter spines situated closely. All three spines triradiate in axial section with wide ridges and thin, deep grooves.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	87
Length of long spine	107
Length of medium spine	80
Length of short spine	67

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Gorgansium* sp. B differs from *G.* sp. A by possessing smaller cortical shell and lesser amount pores on cortical shell.

Gorgansium sp. C

Plate 13, figure 8

Brief Definition: Cortical shell subsphaerical, consisting of large hexagonal and pentagonal pore (predominantly hexagonal) frame, moderately thin Y direction and thick in Z direction. Five pores visible on the top and bottom surface along an axis of primary spines. Primary spines unequal and slightly asymmetrically arranged, two shorter spines situated closely. All three spines triradiate in axial section with wide ridges and thin grooves. Primary spines slightly expanding medially then tapering again distally. Diameter of the cortical shell in all cases shorter than the length of given primary spines.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	105
Length of long spine	170
Length of two short spines	120

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Gorgansium* sp. C. differs from *G.* sp. A and *G.* sp. B. by possessing primary spines with slightly inflated medial part and lesser amount pore frames on the cortical shell.

Genus ***Pantanellium*** PESSAGNO, 1977

Pantanellium PESSAGNO

PESSAGNO, 1977, p. 78

Type Species: *Pantanellium riedeli* PESSAGNO, 1977.

Pantanellium dawsoni PESSAGNO & BLOME, 1980
Plate 13, figure 9

Pantanellium dawsoni PESSAGNO & BLOME
PESSAGNO & BLOME, 1980, pp. 241-242, pl. 2, figs. 8, 9, 15, 16
BLOME, 1984, p. 41, pl. 6, fig. 8

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- late Norian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Pantanellium inornatum PESSAGNO & POISSON, 1981
Plate 13, figure 10; Plate 46, figure 11

Pantanellium inornatum PESSAGNO & POISSON
PESSAGNO & POISSON, 1981, p. 56, pl. 6, figs. 1-9
DE WEVER, 1982b, pp. 128-130, pl. 1, figs. 8-9
YEH, 1992, p. 60, pl. 2, figs. 4, 5

Range (this study): Late Triassic; Rhaetian-early Jurassic; Hettengian.

Total Range (this study and published): Late Triassic; late Norian- early Jurassic; Pliensbachian.

Occurrence: Gumuslu, Lycien Nappes, Burdur and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey; Uson Island, Philippines.

Pantanellium rothwelli PESSAGNO & BLOME, 1980
Plate 13, figure11

Pantanellium rothwelli PESSAGNO & BLOME
PESSAGNO & BLOME, 1980, pp. 244-245, pl. 3, figs. 2, 3, 9, 10, 13, 14, 18
BLOME, 1984, p. 41, pl. 7, figs. 2, 3, 18, 19

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- late Norian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **FERRESIDAE** CARTER, 1993

Genus ***Ferresium*** BLOME, 1984 emend. CARTER, 1993

Ferresium BLOME
BLOME, 1984, p. 42
emend. CARTER, 1993, p. 68

Type Species: *Ferresium laseekense* BLOME, 1984.

Ferresium philippinense YEH & CHENG, 1996
Plate 13, figures 12-13

Ferresium sp. A
YOSHIDA, 1986, pl. 14, fig. 9
Ferresium triquetrum CARTER
BRAGIN & TEKIN, 1996, pl. 2, figs. 4, 5
Ferresium philippinense YEH & CHENG
YEH & CHENG, 1996, p. 7, pl. 4, figs. 1, 3, 5, 9, 10

Range (this study): Late Triassic; late Norian-Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Central Japan; Busuanga Island, Philippines; Ankara Ophiolitic Melange, Eryaman, Ankara and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Ferresium triquetrum CARTER, 1993
Plate 13, figure 14

Ferresium triquetrum CARTER
CARTER, 1993, p. 70, pl. 8, figs. 10, 11, 14
NON BRAGIN & TEKIN, 1996, pl. 2, figs. 4, 5 (=*Ferresium philippinense* YEH & CHENG)

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Ferresium sp. A

Plate 13, figure 15

Ferresium sp. A

CARTER, 1993, pp. 70-71, pl. 8, figs. 2, 3

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus *Risella* CARTER, 1993

Risella CARTER

CARTER, 1993, pp. 71-72

Type Species: *Risella tledoensis* CARTER, 1993.

Risella ellisensis CARTER, 1993

Plate 13, figure 16

Risella ellisensis CARTER

CARTER, 1993, pp. 72, 74, pl. 9, fig. 7

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Risella stalkungiensis CARTER, 1993

Plate 14, figures 1-2

Paronaella sp.

YEH, 1992, p. 62, pl. 2, fig. 12

Risella stalkungiensis CARTER

CARTER, 1993, p. 74, pl. 9, fig. 8

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Uson Island, Philippines; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Risella tledoensis CARTER, 1993

Plate 14, figures 3-4

Gen. nov. C sp. 1

CARTER, 1990, pl. 2, fig. 1

Hagiastrum ? sp.

BRAGIN, 1991a, pl. 7, fig.2

Risella tledoensis CARTER

CARTER, 1993, pp. 75-76, pl. 9, figs. 10, 11, 13

YEH & CHENG, 1996, p. 8, pl. 4, figs. 2, 6

SUGIYAMA, 1997, p. 186, fig. 50-16

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Kunga and Queen Charlotte Islands, British Columbia, Canada; Fareast Russia; Busuanga Island, Philippines; Mino terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Risella sp. A CARTER, 1993

Plate 14, figure 5

Risella sp. A

CARTER, 1993, p. 76, pl. 9, fig. 14

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

FAMILY **GOMBERELLIDAE** KOZUR & MOSTLER,1981

Genus ***Karnospongella*** KOZUR & MOSTLER,1981

Karnospongella KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 42
Type species: *Karnospongella bispinosa* KOZUR & MOSTLER, 1981.

Karnospongella bispinosa KOZUR & MOSTLER, 1981
Plate 14, figures 6-7

Karnospongella bispinosa KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 42, pl. 50, figs. 1, 2
Karnospongella trispinosa LAHM
LAHM, 1984, pp. 42-43, pl. 7, fig. 2
Karnospongella sp. B
YEH, 1989, p. 66, pl. 14, fig. 16
Gomberellus bispinosus (KOZUR & MOSTLER, 1981)
GORICAN & BUSER, 1990, p. 146, pl. 1, fig. 10
HALEMIC & GORICAN, 1995, pl. 1, fig. 6
Bernoullius capricornis BRAGIN
BRAGIN, 1991b, **ONLY** pl. 1, figs. 1, 2
Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /*S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. abneptis* Con. Z.).
Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /*S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. abneptis* Con. Z.).
Occurrence: Göstling, Grossreifling, Austria; East-Central Oregon, USA; Vrisc and Mokronog, Slovenia; Fareast Russia; Northwestern Croatia; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Sugozu Measured Section, Alakircay Nappe and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **INTERMEDIELLIDAE** LAHM, 1984 emend. KOZUR & MOSTLER,1994

Genus ***Paurinella*** KOZUR & MOSTLER, 1981

Paurinella KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 49
Intermediella LAHM
LAHM, 1984, p. 53
Type Species: *Paurinella curvata* KOZUR & MOSTLER, 1981.

Paurinella acutispinosa KOZUR & MOSTLER, 1994
Plate 14, figure 8

Paurinella acutispinosa KOZUR & MOSTLER
KOZUR & MOSTLER, 1994, pp. 71-72, pl. 16, fig. 5
KELLICI & DE WEVER, 1995, p.152, pl. 3, fig. 3
Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).
Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).
Occurrence: Balaton Highland, Hungary; Marmolada Massif, Northern Italy; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.
Remarks: Although specimens from the Sugozu Measured Section do not bear any by-spines, they should be mainly related to preservation otherwise identical.

Paurinella latispinosa KOZUR & MOSTLER,1994
Plate 14, figure 9

Paurinella latispinosa KOZUR & MOSTLER
KOZUR & MOSTLER, 1994, p. 73, pl. 15, fig. 4
Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus*

Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Balaton Highland, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **OERTLISPONGIDAE** KOZUR & MOSTLER, 1980

SUBFAMILY **OERTLISPONGINAE** KOZUR & MOSTLER, 1980 emend. DUMITRICA, 1982a

Genus ***Falcispongus*** DUMITRICA,1982a

Falcispongus DUMITRICA

DUMITRICA, 1982a, p. 65

Type Species: *Falcispongus falciformis* DUMITRICA, 1982a.

Falcispongus falciformis DUMITRICA, 1982a

Falcispongus falciformis* aff. *minor KOZUR & MOSTLER,1996b

Plate 14, figure 10

aff. *Falcispongus falciformis minor* KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 110, pl. 14, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: It differs from holotype by possessing less wider blades.

Genus ***Pterospongus*** DUMITRICA, 1982a

Pterospongus DUMITRICA

DUMITRICA, 1982a, p. 68

Type Species: *Pterospongus patrulii* DUMITRICA, 1982a.

Pterospongus patrulii DUMITRICA, 1982a

Plate 14, figure 13

Pterospongus patrulii DUMITRICA

DUMITRICA, 1982a, p. 68, pl. 7, figs. 5, 6; pl. 8, figs. 4-6; pl. 9, figs. 1, 2

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz).

Occurrence: Rarau, Eastern Carpathians, Romania; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Scutispongus*** KOZUR & MOSTLER,1996b

Scutispongus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 129-130

Type Species: *Scutispongus tortilispinus* KOZUR & MOSTLER, 1996b.

Scutispongus latus KOZUR & MOSTLER, 1996b

Plate 14, figure 11

Scutispongus latus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 139-140, pl. 1, figs. 1-3; pl. 11, fig. 12

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Scutispongus* ? *parvifoliatus KOZUR & MOSTLER, 1996b

Scutispongus* ? *parvifoliatus parvifoliatus KOZUR & MOSTLER,1996b

Plate 14, figure 12

Scutispongus ? *parvifoliatus parvifoliatus* KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 141-142, pl. 13, fig. 6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Scutispongus ploechingeri KOZUR & MOSTLER,1996b

Scutispongus ploechingeri ploechingeri KOZUR & MOSTLER,1996b

Plate 14, figure 14

Scutispongus ploechingeri ploechingeri KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 143, pl. 3, figs. 4, 9, 11

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Scutispongus rostratus (DUMITRICA, 1982a)

Scutispongus rostratus rostratus (DUMITRICA, 1982a)

Plate 15, figure 1

Falciformis rostratus DUMITRICA

DUMITRICA, 1982a, p. 66, pl. 3, figs. 8, 9; pl. 4, figs. 2, 3, 5, 6; pl. 5, figs. 2, 4

GORICAN & BUSER,1990, p. 145, pl. 3, fig.12

DOSZTALY, 1991, pl. 1, fig. 1

Scutispongus rostratus rostratus (DUMITRICA, 1982a)

KOZUR & MOSTLER, 1996b, pp. 132-133, pl. 15, figs. 6, 7, 10, 12

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian.

Occurrence: Rarau mountains and Raru syncline, Eastern carpathians, Rumenia; Vrsic, Slovenia; Hungary; Karawank, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Scutispongus tortilispinus KOZUR & MOSTLER, 1996b

Plate 15, figure 2

Scutispongus tortilispinus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 131, pl. 1, figs. 7, 9-11; pl. 8, figs. 7, 8

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Scutispongus undulatus (DUMITRICA, 1982a)

Plate 15, figure 3

Pterospongus undulatus DUMITRICA

DUMITRICA, 1982a, p. 69, pl. 6, fig. 6; pl. 7, figs. 1, 3

Scutispongus undulatus (DUMITRICA, 1982a)

KOZUR & MOSTLER, 1996b, p. 134, pl. 1, figs. 4-6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.-*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Raru syncline, Romania; Hungary; Fojnica, Bosnia-Hercegovina, Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Spongoserrula*** DUMITRICA,1982a

Spongoserrula DUMITRICA

DUMITRICA, 1982a, p. 67

Type Species: *Spongoserrula rarauana* DUMITRICA,1982a.

Spongoserrula bidentata KOZUR & MOSTLER,1996b

Plate 15, figure 4

Spongoserrula rarauana DUMITRICA

DUMITRICA, 1982a **ONLY** pl. 7, fig. 4

Spongoserrula bidentata KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 117-118, pl. 5, fig. 9; pl. 12, fig. 5

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Raru syncline, Romania; Fojnica, Bosnia-Hercegovina, Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Spongoserrula bifurcata KOZUR & MOSTLER,1996b

Spongoserrula bifurcata bifurcata KOZUR & MOSTLER,1996b

Plate 15, figure 5

Spongoserrula bifurcata bifurcata KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 118, pl. 5, figs. 4, 7

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Spongoserrula fluegeli KOZUR & MOSTLER,1996b

Spongoserrula fluegeli fluegeli KOZUR & MOSTLER,1996b

Plate 15, figure 6

Spongoserrula fluegeli fluegeli KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 121-122, pl. 6, figs. 5, 7, 8, 11; pl. 13, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Spongoserrula rarauana DUMITRICA,1982a

Spongoserrula rarauana rarauana DUMITRICA,1982a

Plate 15, figures 7-8

Spongoserrula rarauana DUMITRICA

DUMITRICA, 1982a, p. 67, pl. 5, figs. 5-7; pl. 6, figs. 1-5, pl. 12, figs. 10-13

NON pl. 7, fig. 4 (=*Spongoserrula bidentata* KOZUR & MOSTLER,1996b)

DOSZTALY, 1991, p. 69, pl. 1, fig. 2 **NON** pl. 3, fig. 1 (=*Spongoserrula goricanae* KOZUR & MOSTLER, 1996 b)

DOSZTALY, 1994, p. 63, pl. 1, fig. 6

KOZUR & MOSTLER, 1996b, pp. 115, pl. 5, figs. 8, 10, 11, 13-15, pl. 6, figs. 1-3, 6, 9; pl. 8, fig. 9

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Rarau Mountains, Easthern Carpathians, Romania; Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Spongoserrula rarauana trinodosa KOZUR & MOSTLER,1996b

Plate 15, figure 9

Spongoserrula rarauana trinodosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 115-116, pl. 5, figs. 8, 12; pl. 12, fig. 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.-*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.-*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Spongoserrula semicircularis KOZUR & MOSTLER, 1996b

Plate 15, figure 10

Spongoserrula semicircularis KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 124, pl. 9, fig. 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.-*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.-*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Steigerispongus*** KOZUR & MOSTLER,1996b

Steigerispongus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 145-146

Type Species: *Steigerispongus subsymmetricus* KOZUR & MOSTLER, 1996b.

Steigerispongus asymmetricus KOZUR & MOSTLER,1996b

Steigerispongus asymmetricus triangulodentatus KOZUR & MOSTLER,1996b

Plate 15, figure 12

Steigerispongus asymmetricus triangulodentatus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, p. 150, pl. 11, fig. 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Steigerispongus subsymmetricus KOZUR & MOSTLER, 1996b

Steigerispongus subsymmetricus latopediculus KOZUR & MOSTLER,1996b

Plate 15, figure 11

Steigerispongus subsymmetricus latopediculus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 147-148, pl. 2, figs. 5, 6, 10

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Steigerispongus subsymmetricus subsymmetricus KOZUR & MOSTLER,1996b

Plate 15, figure 13

Steigerispongus subsymmetricus subsymmetricus KOZUR & MOSTLER

KOZUR & MOSTLER, 1996b, pp. 146-147, pl. 2, figs. 4, 7, 11; pl. 10, figs. 2, 4, 7, 8, 14; pl. 12; figs. 16-18

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegovina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **PARASATURNALIDAE** KOZUR & MOSTLER, 1972 emend. KOZUR & MOSTLER, 1983

SUBFAMILY **PARASATURNALINAE** KOZUR & MOSTLER, 1972

Genus ***Heliosaturnalis*** KOZUR & MOSTLER, 1972

Heliosaturnalis KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, pp. 27-28

Type species: *Heliosaturnalis magnus* KOZUR & MOSTLER, 1972.

Heliosaturnalis transitus KOZUR & MOSTLER, 1972

Plate 16, figure 1

Heliosaturnalis transitus KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 29, pl. 2, fig. 7; pl. 4, fig. 6,

LAHM, 1984, pp. 103-104, pl. 18, fig. 11

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Genus ***Japonisaturnalis*** (KOZUR & MOSTLER, 1972)

Parasaturnalis (Japonisaturnalis) KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 43

Japonisaturnalis (KOZUR & MOSTLER, 1972)

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 168

Type Species: *Spongosaturnalis ? japonicus* YAO, 1972.

Japonisaturnalis multiperforatus (KOZUR & MOSTLER, 1972)

Plate 16, figure 2

Parasaturnalis (Japonisaturnalis) multiperfaratus KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 44, pl. 3, figs. 18, 20

LAHM, 1984, p. 105, pl. 19, fig. 1

Japonisaturnalis multiperfaratus (KOZUR & MOSTLER, 1972)

KOZUR & MOSTLER, 1981, pl. 61, figs. 2, 3

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; early Carnian- middle Carnian.

Occurrence: Gostling and Grossreifling, Austria; Westkarpats; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Genus ***Palaeosaturnalis*** DONOFRIO & MOSTLER, 1978 emend. KOZUR & MOSTLER, 1981

Palaeosaturnalis DONOFRIO & MOSTLER
DONOFRIO & MOSTLER, 1978, p. 33
emend. KOZUR & MOSTLER, 1981, p. 55

Type species: *Spongosaturnalis triassicus* KOZUR & MOSTLER, 1972.

Palaeosaturnalis dotti (BLOME, 1984) Group
Plate 16, figure 3

Acanthocircus dotti BLOME
BLOME, 1984, p. 22, pl. 1, figs. 2, 3, 12
Acanthocircus laxus BLOME
BLOME, 1984, p. 23, pl. 1, figs. 9, 17
Palaeosaturnalis dotti (BLOME, 1984) Group
SUGIYAMA, 1997, p. 183, fig. 51-6

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.)

Total Range (this study and published): Late Triassic; early Norian (*E. triangularis* Con. Z.)- early Jurassic; Sinemurian.

Occurrence: East-Central Oregon, USA; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Atalya Nappes, Kemer, Antalya, Turkey.

Palaeosaturnalis dumitricai n. sp.
Plate 16, figures 4-6

Palaeosaturnalis karnicus (KOZUR & MOSTLER, 1972)
BRAGIN, 1991a, p. 92, pl. 6, fig. 11

Derivation of Name: This species is named for Dr. Paulian DUMITRICA, Bern, Switzerland, in honour of his contributions to the study of Mesozoic Radiolaria.

Holotype: The specimen on plate 16, fig. 4. Sample 98-UKT-59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 21 specimens.

Description: Test with wide ring and circular to subcircular in outline. 12 peripheral spines mainly short, sometimes longer, triangular in shape, wider proximally and decreasing in width very quickly, pointed distally. Axial spines a little bit wider and longer than circumaxial spines. Polar spines short to moderately long, thick and triangular in shape. Inner cavity subcircular in outline.

Measurements (μm):

(Based on the 4 specimens)	HT	Min.	Max.	Av.
Max.diameter of outer ring (without spines)	235	235	300	276
Max. diameter of the inner cavity	145	145	193	170
Max. thickness of ring	50	45	60	55.5
Max. length of axial spines	60	40	120	80
Max. length of circumaxial spines	40	40	67	50

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Fareast Russia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Palaeosaturnalis dumitricai* n. sp. differs from both *P. karnicus* (KOZUR & MOSTLER) and *P. harrisonensis* (BLOME) by having wider ring and shorter triangular peripheral spines.

Palaeosaturnalis hugluensis n. sp.

Plate 16, figures 7-9

Derivation of Name: According to its occurrence at Huglu Unit.

Holotype: The specimen on plate 16, fig. 7. Sample 96-UKT-707. Deposited at MTA.

Type Locality: Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey (See locality description).

Material: More than 30 specimens.

Description: Ring flat and broad. Axial and circumaxial spines massive, triangular, tapering distally, one side of the spines curved to inside. 11-13 circumaxial spines closely spaced. Two axial spines have a same size with circumaxial spines. Polar spines long. Inner cavity mainly circular to subcircular.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max.diameterof outer ring (without spines)	350	320	350	334
Max. diameter of the inner cavity	190	190	220	203
Max. length of circumaxial spines	90	73	90	85
Max. length of axial spines	90	60	100	83

Range (this study): Late Triassic; middle Carnian.

Occurrence: Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Remarks: This species could easily be distinguished from the other species of genus *Palaeosaturnalis* DONOFRIO & MOSTLER by having curved axial and circumaxial spines.

Palaeosaturnalis karnicus (KOZUR & MOSTLER, 1972)

Plate 16, figure 10

Spongosaturnalis karnicus KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 37, pl. 4, fig. 7

Palaeosaturnalis karnicus (KOZUR & MOSTLER, 1972)

NON BRAGIN, 1991a, p. 92, pl. 6, fig. 11 (=*Palaeosaturnalis dumitricai* n. sp.)

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Göstling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Palaeosaturnalis latiannulatus KOZUR & MOSTLER, 1983

Plate 17, figures 1-2

Palaeosaturnalis latiannulatus KOZUR & MOSTLER

KOZUR & MOSTLER, 1983, p. 20, pl. 5, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.)

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.)

Occurrence: Western Karpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Palaeosaturnalis mocki KOZUR & MOSTLER, 1983

Plate 17, figure 3

Palaeosaturnalis mocki KOZUR & MOSTLER

KOZUR & MOSTLER, 1983, p. 21, pl. 5, fig. 2

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Western Karpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Palaeosaturnalis raridenticulatus KOZUR & MOCK, 1981
Plate 17, figures 4-5

Palaeosaturnalis raridenticulatus KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 56, pl. 61, fig. 5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Western Karpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Palaeosaturnalis triassicus (KOZUR & MOSTLER, 1972)
Plate 17, figures 6-7

Spongosaturnalis triassicus KOZUR & MOSTLER
KOZUR & MOSTLER, 1972, p. 40, pl. 1, fig. 1; pl. 4, figs. 1, 2
NON DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 81, pl. 2, fig. 2
Palaeosaturnalis triassicus (KOZUR & MOSTLER, 1972)
KOZUR & MOSTLER, 1981, p. 55
KOZUR & MOSTLER, 1983, pl. 6, fig. 2
LAHM, 1984, pp. 97-98, pl. 17, fig. 11
DOSZTALY, 1993, pl. 4, fig. 1
Acanthocircus triassicus (KOZUR & MOSTLER, 1972)
NON DE WEVER, 1982b, pp. 207-208, pl. 13, fig. 10

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Göstling, Grossreifling, Austria; Balaton, Hungary; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

***Palaeosaturnalis* spp.**
Plate 17, figures 8-11

Range (this study): Late Triassic; early Carnian.

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: Many broken parts of the different species of the genus *Palaeosaturnalis* DONOFRIO & MOSTLER with wide ring and 9-10 circumaxial spines tapering distally, triangular, obtained from Sugozu Measured Section from the Alakircay Nappe. Unfortunately, bad preservation does not allow determining these oldest representatives of genus *Palaeosaturnalis* DONOFRIO & MOSTLER.

Genus ***Praehexasaturnalis*** KOZUR & MOSTLER, 1983 emend. KOZUR & MOSTLER, 1990

Praehexasaturnalis KOZUR & MOSTLER
KOZUR & MOSTLER,1983, p. 30
emend. KOZUR & MOSTLER,1990, pp. 194-195

Type Species: *Palaeosaturnalis tenuispinosus* DONOFRIO & MOSTLER, 1978.

Praehexasaturnalis burnensis (BLOME, 1984)
Plate 18, figure 1

Acanthocircus burnensis BLOME
BLOME, 1984, pp. 21-22, pl. 1, figs. 1, 11
Acanthocircus lupheri BLOME
BLOME, 1984, pp. 23-24, pl. 1, figs. 10, 18
Acantocircus macoyensis BLOME
BLOME, 1984, p. 24, pl. 2, figs. 1, 12
Acanthocircus ochocoensis BLOME
BLOME, 1984, p. 24, pl. 2, figs. 2, 13
Acanthocircus prinevillensis BLOME
BLOME, 1984, p. 24, pl. 2, figs. 3, 14
Praehexasaturnalis burnensis (BLOME, 1984)
KOZUR & MOSTLER, 1990, p. 194
Palaeosaturnalis prinevillensis (BLOME, 1984)
YANG & MIZUTANI, 1991, p. 66-67 , pl. 2, figs. 7, 8; pl. 3, figs. 3, 5, 9
CARTER, WHALEN & GUEX, 1998, p. 54, pl. 14, figs. ?19, 23

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. triangularis* Con. Z.)-early Jurassic; Sinemurian.

Occurrence: East-Central Oregon, USA; Northeast China; Queen Charlotte Islands, British Columbia, Canada; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Praehexasaturnalis tenuispinosus (DONOFRIO & MOSTLER, 1978)

Plate 18, figure 2

Palaeosaturnalis tenuispinosus DONOFRIO & MOSTLER

DONOFRIO & MOSTLER, 1978, pp. 37-38; pl. 7, figs. 1-3, 8

Spongosaturnalis sp. cf. *S. elegans* KOZUR & MOSTLER

DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 81, pl. 2, figs. 3, 4

Palaeosaturnalis aff. *tenuispinosus* DONOFRIO & MOSTLER

YAO, 1982, pl. 3, fig. 17

Acanthocircus tenuispinosus (DONOFRIO & MOSTLER, 1978)

DE WEVER, 1982b, pp. 206-207, pl. 13, figs. 3-5

YEH, 1990, p. 17, pl. 13, fig. 3

Praehexasaturnalis tenuispinosus (DONOFRIO & MOSTLER, 1978)

KOZUR & MOSTLER, 1983, p. 29

KOZUR & MOSTLER, 1990, p. 194

SUGIYAMA, 1997, p. 185, fig. 51-9, ?10

Acanthocircus vigrassi BLOME

BLOME, 1984, p. 26, pl. 2, figs. 9-10

Acanthocircus cf. *A. elegance* KOZUR & MOSTLER

YOSHIDA, 1986, pl. 15, figs. 8, 9

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. triangularis* Con. Z.)-early Jurassic; Hettengian.

Occurrence: Poetschen, Austria; Ispartacay Formation, Isparta and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey; East-Central Oregon, USA; Inuyama Area, Gifu Prefecture and Mino Terrane Central Japan; Busuanga Island, Philippines.

Genus *Praemesosaturnalis* KOZUR & MOSTLER, 1981

Praemesosaturnalis KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 58

Type species: *Spongosaturnalis bifidus* KOZUR & MOSTLER, 1972.

Praemesosaturnalis ellipticus n. sp.

Plate 18, figures 3-5

Derivation of Name: Due to its elliptical outline.

Holotype: The specimen on plate 18, fig. 3. Sample 96-UKT-476. Deposited at MTA.

Type Locality: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey (See locality description).

Material: 12 specimens.

Description: Test wide with flat ring, long, ellipsoidal in outline. 17-18 broad spines short to moderately long, not equal to each other, triangular and tapering distally. Polar rays long, narrow, auxiliary spines (two either side of polar spines) have same length and shape with polar rays. Ring cavity elliptical in outline.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max. diameter of outer ring (without spines)	353	335	353	344
Max. diameter of the inner cavity	293	275	293	284
Max. thickness of ring	27	25	35	29
Max. length of peripheral spines	67	30	67	53

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This species differs from *P. sandspitense* (BLOME) by having an long, elliptical outline instead of circular to subcircular and 17-18 peripheral spines instead

of 14. *P. huxleyense* (CARTER) has circular to subcircular outline and lesser amount peripheral spines (10-14).

Praemesosaturnalis pseudokahleri
SUGIYAMA, 1997
Plate 18, figure 6

Kozurastrum spp.
BRAGIN & TEKIN, 1996, **ONLY** pl. 2, fig. 6
Praemesosaturnalis pseudokahleri SUGIYAMA
SUGIYAMA, 1997, p. 67, figs. 28-3, 45-8, 9

Range (this study): Late Triassic; late Norian.

Total Range (this study and published): Late Triassic; late Norian.

Occurrence: Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey; Mino Terrane, Central Japan.

Praemesosaturnalis rugosus (YEH, 1990)
Praemesosaturnalis rugosus rugosus (YEH, 1990)

Palaeosaturnalis sp. F
KISHIDA & SUGANO, 1982, pl. 3, fig. 14
Acanthocircus convertus KOZUR & MOSTLER
YOSHIDA, 1986, pl. 15, figs. 4-6
Pseudoheliodiscus rugosus YEH
YEH, 1990, p. 19, pl. 12, figs. 10, 14; pl. 13, fig. 12
NON YEH & CHENG, 1996, p. 9, pl. 3, figs. 8, 9, 10(=*Praemesosaturnalis rugosus yehae* n. subsp.)
?*Pseudoheliodiscus* sp. aff. *S. rugosus* YEH
YEH, 1990, p. 19, pl. 12, figs. 3, 6
Praemesosaturnalis rugosus (YEH, 1990)
SUGIYAMA, 1997, p.185, fig. 51-17

Praemesosaturnalis rugosus yehae n. subsp.
Plate 18, figures 7-8

Palaeosaturnalis sp. D
KISHIDA & SUGANO, 1982, pl. 3, fig. 11
Palaeosaturnalis sp. E
KISHIDA & SUGANO, 1982, pl. 3, figs. 12, 13
Palaeosaturnalis sp. J
KISHIDA & SUGANO, 1982, pl. 4, figs. 1, 2, 4
NON 3
Pseudoheliodiscus rugosus YEH
NON YEH, 1990, p. 19, pl.12, figs. 10, 14; pl. 13, fig. 12 (=*Praemesosaturnalis rugosus rugosus* (YEH, 1990))
YEH & CHENG, 1996, p. 9, pl. 3, figs. 8, 9, 10
Kozurastrum spp.
BRAGIN & TEKIN, 1996 **ONLY** pl. 2, fig. 7
Praemesosaturnalis sp. A
SUGIYAMA, 1997, p. 167, fig. 45-10

Derivation of Name: This species is named for Dr. Kuei Yu YEH, National Museum of Natural Science, Taiwan, in honour of her contributions to the study of Triassic, Jurassic and Recent Radiolaria.

Holotype: The specimen on plate 18, figure 7. Sample 94-B-1-7. Deposited at MTA.

Type Locality: Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey (See locality description).

Material: 5 specimens.

Description: Test with moderately wide flat ring and circular in outline. Generally 11 peripheral spines surround periphery of the ring (5-6 to either side of the polar axis). Peripheral spines wide, straight, long, approximately same in width close to termination and rapidly tapering at the end (triangular in shape) and pointed distally. Every peripheral spines have well-developed ridges at their central axis. Internal rays (differs between 7 to 9) differentiated into polar and auxiliary rays and polar rays a little bit longer than auxiliary ones. Inner cavity circular and moderately large.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Max. diameter of outer ring (without spines)	233	-	-	233
Max. diameter of the inner cavity	173	-	-	173
Max. thickness of ring	34	34	46	40
Max. length of peripheral spines	113	113	167	140

Range (this study): Late Triassic; late Norian

Total Range (this study and published): Late Triassic; late Norian- ?Rhaetian.

Occurrence: Southwest and Mino Terrane, Central Japan; Busuanga Island, Philippines; Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey;

Remarks: *Praemesosaturnalis rugosus yehae* n. subsp. could be distinguished from *P. rugosus rugosus* (YEH) by possessing more longer straight and wide peripheral spines only tapering at the distal part (only distal part triangular) instead of completely triangular ones and displaying no twisting spines instead of slightly or strongly twisted ones. Furthermore, former has strongly developed ridge at the central axis of each peripheral spine instead of very weak occurrence (sometimes not present).

Praemesosaturnalis sandspitense (BLOME, 1984)

Plate 18, figure 9

Palaeosaturnalis aff. *quinquespinosa* (KOZUR & MOSTLER)

YAO, 1982, pl. 3, fig. 18

Pseudoheliodiscus sandspitensis BLOME

BLOME, 1984, p. 27, pl. 3, figs. 6, 7

YOSHIDA, 1986, pl. 15, fig. 10

BLOME, REED & TAILLEUR, 1989, pl. 33.2, fig. 21

CHENG, 1989, p. 146, pl. 9, fig. 10

Kozurastrum sandspitense (BLOME, 1984)

CARTER, 1993, p. 54, pl. 4, fig. 2

Kozurastrum sp. aff. *K. sandspitense* (BLOME, 1984)

CARTER, 1993, p. 54, pl. 4, fig. 3

Praemesosaturnalis sandspitense (BLOME, 1984)

SUGIYAMA, 1997, p. 185, fig. 51-11

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Inuyama Area, Gifu Prefecture and Mino Terrane, Central Japan; Kunga and Queen Charlotte Islands, British Columbia, Canada; Uson Island, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus ***Pseudoheliodiscus*** KOZUR & MOSTLER, 1972
emend. PESSAGNO, 1979

Pseudoheliodiscus KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, pp. 24-25

emend. PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 169-170

Pessagnosaturnalis KOZUR

KOZUR, 1979, p. 670

Type species: *Pseudoheliodiscus riedeli* KOZUR & MOSTLER, 1972.

Pseudoheliodiscus elongatus n. sp.

Plate 19, figures 1-2

Derivation of Name: Due to its long axial spines giving elongated shape to test.

Holotype: The specimen on plate 19, figure 1. Sample 96-UKT-676. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 7 specimens.

Description: Spongy shell large, a little smaller than the inner margin of the ring. Ring wide and circular in outline. Peripheral spines in different shape. Axial spines massive, long and mainly longer than the circumaxial spines. 8 circumaxial spines, 4 each side of axis offered by axial and polar spines and different in shape, some of them short, triangular some of them thin and long. Ring cavity subcircular. 2 polar spines short and thick, auxiliary spines short, thin, 3 to each side axis formed by polar spines.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Max.diameter of outer ring (without spines)	225	210	267	250.5
Max. diameter of the inner cavity	110	110	133	122
Max. thickness of ring	55	50	87	68
Max. length of axial spines	155	120	155	141
Max. length of circumaxial spines	70	70	213	125

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Pseudoheliodiscus elongatus* n. sp. differs from *P. finchi* PESSAGNO by having longer and irregularly oriented circumaxial spines and longer axial spines.

Pseudoheliodiscus primitivus (KOZUR & MOSTLER, 1972)
Plate 19, figure 3

Spongosaturnalis primitivus KOZUR & MOSTLER
KOZUR & MOSTLER, 1972, pp. 38-39, pl. 4, fig. 5; pl. 2, fig. 10
DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, pp. 80-81, pl. 19, fig. 6
Pseudoheliodiscus primitivus (KOZUR & MOSTLER, 1972)
DE WEVER, 1982b, pp. 220-221, pl. 19, fig. 6

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; early Carnian- middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Karpennission, Greece; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Pseudoheliodiscus validus (DONOFRIO & MOSTLER, 1978)
Plate 19, figure 4

Palaeosaturnalis validus DONOFRIO & MOSTLER
DONOFRIO & MOSTLER, 1978, pp. 38-39, pl. 7, figs. 4-6, 10
Spongosaturnaloides validus (DONOFRIO & MOSTLER, 1978)
KOZUR & MOSTLER, 1981, pp. 54-55

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. triangularis* Con. Z.)-late Norian.

Occurrence: Potschen, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Stauroacanthocircus*** KOZUR & MOSTLER, 1983
emend. KOZUR & MOSTLER, 1990

Stauroacanthocircus KOZUR & MOSTLER
KOZUR & MOSTLER, 1983, pp. 30-31
emend. KOZUR & MOSTLER, 1990, pp. 196-197

Type Species: *Pseudoheliodiscus concordis* DE WEVER, 1981.

Stauroacanthocircus kayai n. sp.
Plate 19, figures 5-6

Derivation of Name: This species is named for Prof. Dr. Orhan KAYA, Dokuz Eylül University, Izmir, Turkey, in honour of his contributions to the study of Turkish geology.

Holotype: The specimen on plate 19, figure 5. Sample 98-UKT-59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 15 specimens.

Description: Test with wide, flat ring and circular to subcircular in outline. 4 peripheral spines moderately long, equal in length, tapering distally and pointed. 2 polar and 2 auxiliary spines in cross like arrangements. Ring cavity subcircular in outline.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max.diameter of outer ring (without spines)	287	287	330	308
Max. diameter of the inner cavity	200	200	233	211
Max. thickness of ring	47	47	70	55
Max. length of peripheral spines	87	87	200	132

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Stauroacanthocircus kayai* n. sp. differs from *S.* ? *poetschensis* KOZUR &

MOSTLER by having circular outline and lesser amount of peripheral spines.

Stauroacanthocircus* ? *poetschensis KOZUR & MOSTLER, 1990

Plate 19, figures 7-8

Stauroacanthocircus ? *poetschensis* KOZUR & MOSTLER

KOZUR & MOSTLER, 1990, pp. 199-200, pl 7, fig. 8, pl. 8, figs. 1, 4

Range (this study): Late Triassic; early Norian (Top of the *E. abneptis* Con. Z.- *E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (Top of the *E. abneptis* Con. Z.)- middle Norian.

Occurrence: Pötschenwand, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **PSEUDOACANTHOCIRCIDAE** KOZUR & MOSTLER,1990

Genus ***Pseudoacanthocircus*** KOZUR & MOSTLER, 1990

Pseudoacanthocircus KOZUR & MOSTLER

KOZUR & MOSTLER, 1990, pp. 207-208

Type Species: *Pseudoacanthocircus mediospinosus* KOZUR & MOSTLER, 1990.

Pseudoacanthocircus sugiyamai n. sp.

Plate 19, figures 10-12

Pseudoacanthocircus sp. C

SUGIYAMA, 1997, p. 168, fig. 45-14

Derivation of Name: This species is named for Dr. Kazuhiro SUGIYAMA, Geological Survey of Japan, Tsukuba, Japan, in honour of his contributions to the study of Triassic and recent Radiolaria biostratigraphy.

Holotype: The specimen on plate 19, figure 10. Sample 98-UKT-17. Deposited at MTA.

Type Locality: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey (See locality description).

Material: 15 specimens.

Description: Test large with thin ring, subcircular to slightly transversally ellipsoidal in outline. Ring surrounded 16-18 short, triangular peripheral spines, sharply tapering. Two polar rays thin and long. Internal sphere not preserved in type material. Inner cavity subcircular in outline.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max. diameter of outer ring (without spines)	255	245	270	257
Max. diameter of the inner cavity	220	220	245	228
Max. thickness of ring	15	15	18	16
Max. length of peripheral spines	20	15	20	18

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; middle Norian- early Jurassic; Sinemurian.

Occurrence: Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: *Pseudoacanthocircus sugiyamai* n. sp. differs from *P. troegeri* KOZUR & MOSTLER by possessing lesser amount and shorter peripheral spines (16-18 instead of 24). It is distinguished from *P.* sp. A by possessing more amount peripheral spines (16-18 instead of 12) and more circular to transversally elongated (instead of longitudinally elongated) outline.

***Pseudoacanthocircus* sp. A**

Plate 19, figure 9

Pseudoacanthocircus sp. B

SUGIYAMA, 1997, p. 168, fig. 45-13

Brief Definition: Test large with thin ring, subcircular to longitudinally ellipsoidal in outline. Ring surrounded 12 short triangular peripheral spines, sharply tapering. Two polar rays long, 8-9 times longer than peripheral spines. Internal sphere not preserved in type material.

Measurements (μm):

(Based on the 1 specimen)

Max. diameter of the outer ring (without spines)	275
Max. diameter of the inner cavity	245
Max. thickness of ring	15
Max. length of peripheral spines	20

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; middle Norian- early Jurassic; Sinemurian.

Occurrence: Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: *Pseudoacanthocircus* sp. A has been compared to *P. sugiyamai* n. sp. under latter species.

FAMILY **VEGHICYCLIIDAE** KOZUR & MOSTLER, 1972

Genus ***Veghicyclia*** KOZUR & MOSTLER, 1972

Veghicyclia KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, pp. 10-11

Type species: *Veghicyclia pulchra* KOZUR & MOSTLER, 1972.

Veghicyclia austrica KOZUR & MOSTLER, 1972

Plate 20, figure 1

Veghicyclia austrica KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 12, pl. 4, figs. 10, 15 **NON** pl. 3, fig. 3 (=*V. haeckeli* KOZUR & MOSTLER, 1972)

LAHM, 1984, pp. 94-95, pl. 17, fig. 6

Veghicyclia sp. cf. *V. austrica* KOZUR & MOSTLER

NON PESSAGNO, in PESSAGNO, FINCH & ABBOTT, 1979, p. 171, pl. 6, fig. 15

Veghicyclia robusta KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 14, pl. 3, figs. 1, 4, 7

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Veghicyclia* sp. aff. *V. globosa KOZUR & MOSTLER, 1972

Plate 20, figure 2

aff. *Veghicyclia globosa* KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, pp. 12-13, pl. 3, figs. 9, 16?

NON KOZUR & MOSTLER, 1983, pl. 7, fig. 4 (=*V. multispinosa* KOZUR & MOSTLER, 1972)

Range (this study): Late Triassic; early Norian (E.abneptis Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This form differs from holotype of *V. globosa* KOZUR & MOSTLER by possessing more amount row of pores on the equatorial disc.

Veghicyclia haeckeli KOZUR & MOSTLER, 1972

Plate 20, figure 3

Veghicyclia haeckeli KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, p. 13, pl. 4, fig. 13 **NON** pl. 3, fig. 2 (=*V. goestlingensis* KOZUR & MOSTLER, 1972)

LAHM, 1984, p. 95, pl. 17, fig. 7

Veghicyclia austrica KOZUR & MOSTLER

KOZUR & MOSTLER, 1972, **ONLY** pl. 3, fig. 3

Range (this study): Late Triassic; early Norian (E.abneptis Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (E.abneptis Con. Z.).

Occurrence: Gostling, Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **ORBICULIFORMIDAE** PESSAGNO, 1973

Genus ***Orbiculiforma*** PESSAGNO, 1973

Orbiculiforma PESSAGNO
PESSAGNO, 1973, pp. 71-72
Praeorbiculiformella KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 163

Type species: *Orbiculiforma quadrata* PESSAGNO, 1973.

Orbiculiforma cedrosensis PESSAGNO, 1979
Plate 20, figure 4

Orbiculiforma cedrosensis PESSAGNO
PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 166, pl. 3, figs. 13-14

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.- *E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- late middle Norian.

Occurrence: Baja California Sur, Mexico; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Orbiculiforma gazipasaensis n. sp.
Plate 20, figures 5-7

Derivation of Name: For its occurrence in the territory of Gazipasa town.

Holotype: The specimen on plate 20, figure 5. Sample 96-UKT-524. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 5 specimens.

Description: Test large, roughly circular in outline with small incisions at periphery. It possesses large rim and deep central cavity, width of the central cavity about half of the test diameter. Sides of test sloping from central cavity to periphery resulting in an angled periphery. Pore frames mainly tetragonal to pentagonal. Central part of the central cavity moderately to well raised. No equatorial spine observed.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max. diameter of the test	370	335	380	361
Max. diameter of the central cavity	160	155	160	156
Max. diameter of the central raising	100	85	100	95

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Orbiculiforma gazipasaensis* n. sp. could easily be distinguished from the other species of the Triassic genus *Orbiculiforma* PESSAGNO by having large, circular test without equatorial spines and moderately developed central raising.

Orbiculiforma goestlingensis (KOZUR & MOSTLER, 1978) n. comb.
Plate 20, figures 8-9

Praeorbiculiformella goestlingensis KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 164, pl. 1, figs. 10, 13; pl. 4, fig. 3
LAHM, 1984, p. 93, pl. 17, fig. 2

Range (this study): Late Triassic; early Carnian (*T. kretaensis* Rad. Z.)- middle Carnian.

Total Range (this study and published): Late Triassic; early Carnian (*T. kretaensis* Rad. Z.)- middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya and Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Remarks: *Praeorbiculiformella* KOZUR & MOSTLER is the junior synonym of genus *Orbiculiforma* PESSAGNO.

Orbiculiforma karnica (KOZUR & MOSTLER, 1978) n. comb.

Plate 20, figure 10

Praeorbiculiformella karnica KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 165, pl. 1, fig. 14

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; middle Carnian.

Occurrence: Göstling, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Praeorbiculiformella* KOZUR & MOSTLER is the junior synonym of genus *Orbiculiforma* PESSAGNO.

Orbiculiforma octogonalis n. sp.

Plate 21, figures 1-3

Derivation of Name: Because of its octagonal outline.

Holotype: The specimen on plate 21, figure 1. Sample 97-UKT-133. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 22 specimens.

Description: Test large, roughly octagonal to circular in outline with a rather short rim and wide, deep central cavity. 8 main equatorial spines slender and round in cross section and mainly situated in the each corner, sometimes rare small subsidiary spines also present. Spongy meshwork large at all central cavity and rim, pore frames predominantly tetragonal to pentagonal. The central area of the central cavity less to moderately raised.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Max. diameter of the test	320	300	330	317
Max. diameter of the central cavity	250	215	250	238
Max. length of the equatorial spines	-	45	55	50

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Orbiculiforma octogonalis* n. sp. differs from *O. cedrosensis* PESSAGNO by possessing shorter rim, wider central cavity and longer, straight equatorial spines instead of triangular ones.

Orbiculiforma plana (KOZUR & MOSTLER, 1978) n. comb.

Plate 21, figure 4

Praeorbiculiformella plana KOZUR & MOSTLER
KOZUR & MOSTLER, 1978, p. 164, pl. 1, figs. 11, 12, 15; pl. 4, figs. 1, 2, 4, 9, 10
LAHM, 1984, p. 92, pl. 16, fig. 11

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Gostling and Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Praeorbiculiformella* KOZUR & MOSTLER is the junior synonym of genus *Orbiculiforma* PESSAGNO.

Orbiculiforma vulgaris (KOZUR & MOSTLER, 1978) n. comb.

Plate 21, figure 5

Praeorbiculiformella vulgaris KOZUR & MOSTLER

KOZUR & MOSTLER, 1978, p. 166, pl. 1, fig. 16, pl. 4, figs. 5, 7

? LAHM, 1984, pp. 92-93, pl. 17, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Göstling, Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Praeorbiculiformella* KOZUR & MOSTLER is the junior synonym of genus *Orbiculiforma* PESSAGNO.

Orbiculiforma sp. A

Plate 21, figure 6

Brief Definition: Test relatively small, hexagonal in outline and 6 equatorial spines situated in every corner. Equatorial spines long, slender and tapering distally. Sides of sloping from central cavity to periphery resulting in angled periphery. Spongy meshwork mainly composed of polygonal pore frames.

Measurements (μm):

(Based on the 1 specimen)

Max. diameter of the test	150
Max. diameter of the central cavity	100
Max. length of the equatorial spines	65

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Orbiculiforma* sp. A is differentiated by the other species of the genus *Orbiculiforma* PESSAGNO by virtue of hexagonal outline and long, slender equatorial spines.

Genus ***Pseudogodia*** n. gen.

Type species: *Pseudogodia sonmezi* n. gen., n. sp.

Derivation of Name: For the similarity to Cretaceous genus *Godia* WU

Description: Test thick, roughly hexagonal in outline composing of big nodes. Each side of the test slightly convex. Rim of the test mainly includes big nodes (six to seven) in different size mainly situated in every corner but sometimes irregular. Nodes separating from each other and from central nodes by shallow depressions. Central nodes have same feature those of nodes situated at the side of the test. Meshwork consisting of irregular polygonal (mainly trigonal and hexagonal) pore frames and mainly circular pores in different size. Test possesses two peripheral spines tapering distally and circular in cross section, usually one of them robust and thicker than the other could be the polar spine.

Included species:

Pseudogodia sonmezi n. gen., n. sp.

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: This genus could be distinguished from the genus *Orbiculiforma* PESSAGNO by having polygonal outline instead of circular, strong nodes both at rim and center of the test. It differs also from Cretaceous genus *Godia* WU by possessing polygonal outline instead of circular and whole test of former composing mainly large nodes, latter has small pores on the surface of the test.

Pseudogodia sonmezi n. gen., n. sp.

Plate 21, figures 7-8

Derivation of Name: This species is named for B. Sc. Ilhan SONMEZ, General Directorate of Mineral Research and Exploration (MTA), Ankara, Turkey, in honour of his contributions to the study of Taurus Mountain geology and for his kind critics on this study.

Holotype: The specimen on plate 21, figure 7. Sample 96-UKT-544. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 9 specimens.

Description: Same as genus.

Measurements (μm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Max. width of the test	375	300	375	337.5
Max. diameter of the nodes	115	100	115	107.5
Length of polar spine	?	90	90	90

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: Same as genus.

FAMILY **RELINDELLIDAE** KOZUR & MOSTLER, 1980

Genus ***Pentaspongodiscus*** KOZUR & MOSTLER, 1979 emend. DUMITRICA, KOZUR & MOSTLER,1980

Pentaspongodiscus KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 79-80

emend. DUMITRICA, KOZUR & MOSTLER, 1980, p. 9

Type Species: *Pentaspongodiscus tortilis* KOZUR & MOSTLER, 1979

Pentaspongodiscus crosi KELLICI & DE WEVER, 1995 n. comb.

Plate 22, figure 1

Pentaspongodiscus ladinicus crosi KELLICI & DE WEVER

KELLICI & DE WEVER, 1995, p. 154, pl. 4, fig. 4

Pentaspongodiscus aff. *ladinicus crosi* KELLICI & DE WEVER

NON KELLICI & DE WEVER, 1995, p. 156, pl. 4, fig. 5 (=*Pentaspongodiscus discoides* n. sp.)

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Marmolada Massif, Northern Italy; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *P. crossi* KELLICI & DE WEVER has strongly twisted primary spines not similar to those of *P. ladinicus* DUMITRICA, KOZUR & MOSTLER.

Pentaspongodiscus* ? *dihexacanthus CARTER, 1993 Group

Plate 22, figures 2-4

Pentaspongodiscus ? *dihexacanthus* CARTER

CARTER, 1993, pp. 87-88, pl. 13, figs. 1, 2, 3

? SUGIYAMA, 1997, p. 184, fig. 51-9

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian- ?early Jurassic;? Sinemurian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; ?Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It includes different forms both with long and short radial spines.

Pentaspongodiscus discoides n. sp.

Plate 22, figures 5-7

Pentaspongodiscus cf. *ladinicus* DUMITRICA, KOZUR & MOSTLER

GORICAN & BUSER, 1990, p. 151, pl. 2, fg. 4

Pentaspongodiscus aff. *ladinicus crosi* KELLICI & DE WEVER

KELLICI & DE WEVER,1995, p. 156, pl. 4,fig. 5

Derivation of Name: For its disc-shaped cortical shell.

Holotype: The specimen on plate 22, figure 5. Sample 96-UKT-522. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Medium sized spongy disc with pentagonal outline. Five stout spines arranged in one plane, length of spine shorter than the diameter of the shell. Primary spines triradiate in axial section ornamented with three alternating ridges and deep grooves and proximally straight then distally strongly twisted, termination pointed, sometimes with short needle-like spines.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of the test	150	143	165	152.5
Length of the straight Part of the spine	60	50	62	57
Total length of the spine	110	100	127	115.5
Width of the spine (proximally)	30	30	31	30.5
Max. width of the spine	35	35	40	37

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Vrsic and Mokronog, Slovenia; Marmolada Massif, Northern Italy; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Pentaspongodiscus discoides* n. sp. differs from *P. ladinicus ladinicus* DUMITRICA, KOZUR & MOSTLER by possessing shorter, stronger and strongly twisted spines. It also differs from *P. crosi* KELLICI & DE WEVER by possessing larger test.

Pentaspongodiscus steigeri LAHM, 1984

Plate 22, figures 8-9

Pentaspongodiscus steigeri LAHM

LAHM, 1984, pp. 56-57, pl. 9, fig. 12

KOZUR, KRAINER & MOSTLER, 1996, p. 231, pl. 4, fig. 15

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian

Total Range (this study and published): Middle Triassic; late Anisian- late Triassic; early Carnian.

Occurrence: Recaoro, North Italy; Carinthia, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Tetraspongodiscus*** KOZUR & MOSTLER, 1979

Tetraspongodiscus KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 80-81

Type Species: *Tetraspongodiscus longispinosus* KOZUR & MOSTLER, 1979.

Tetraspongodiscus nazarovi (KOZUR & MOSTLER, 1981)

Plate 22, figure 10

Plafkerium ? *nazarovi* KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 72, pl. 57, fig. 1; pl. 58, fig. 1

Tetraspongodiscus nazarovi (KOZUR & MOSTLER, 1981)

LAHM, 1984, pp. 59-60, pl. 10, fig. 7

Range (this study): Middle Triassic; late Triassic; middle Carnian

Total Range (this study and published): Middle Triassic; early Ladinian- late Triassic; middle Carnian.

Occurrence: Recaoro, Italy; Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

SPUMELLARIA INCERTAE SEDIS

Genus ***Tauridastrum*** n. gen.

Type species: *Tauridastrum longitubus* n. gen., n. sp.

Derivation of Name: Due to its type locality located at Taurus Belt.

Description: Test composing globular cortical shell with many needle-like spines oriented in different direction and one tube like extension. Overall shape vase-like. Surface of the cortical shell double layered, outer pore frames highly elevated polygonal and inner with mainly triangular pore frames and mainly elongated pores in different size. In different part of the test, many (5 to 10) long, thin needle-like spines extend out to different direction. One big porous tube situated at the one side of the test. Tube tapering into the center and expanding distally with many circular to elliptical pores in different size. No partitions present in the tube and at well preserved material long, thin, needle-like (tapering distally and circular in cross section) spine present at the end of tube.

Included Species:

Tauridastrum longitubus n. gen., n. sp.

Spumellaria gen. et sp. indet. D. SUGIYAMA, 1997, fig. 51-20

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)-middle Norian.

Occurrence: Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could be distinguished from the genus *Monocapnuchosphera* n. gen. by having simple, porous tube without partitions instead of tumidispina and many needle-like spines oriented in different directions.

Tauridastrum longitubus n. gen., n. sp.

Plate 23, figures 1-3

Derivation of Name: This species is named with respect to its long tube extension.

Holotype: The specimen on plate 23, figure 1. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 3 specimens.

Description: Same as genus.

Measurements(μm):(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Diameter of the cortical shell	207	207	220	213.5
Width of tube proximally	60	60	60	60
Length of tube excluding spine	188	188	227	207.5
Length of spines on the cortical shell	73	67	73	70
Length of spine at the end of tube	140	-	-	140

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey

Remarks: Same as genus.

Genus *Xiphosphaera* HAECKEL, 1882

Type species: *Xiphosphaera tredicomporata* HAECKEL, 1885.

Xiphosphaera fistulata CARTER, 1991

Plate 23, figures 4-6

Xiphosphaera fistulata CARTER

CARTER, 1991, p. 200, pl. 1, figs. 4, 5, 7, 8, 9, 10

SUGIYAMA, 1997, p. 188, fig. 50-27

? Unnamed Spumellaria

YEH AND CHENG, 1996, pl. 11, figs. 11, 16

Range (this study): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. triangularis* Con. Z.).

Occurrence: Queen Charlotte Islands, British Columbia, Canada; ? Busuanga Island, Philippines; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Spumellaria genus and species indetermined

Spumellaria gen. and sp. indet. A

Plate 23, figure 7

Spumellaria gen. and sp. indet. B

CARTER, 1993, p. 92, pl. 13, figs. 6, 8, 11

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Spumellaria gen. and sp. indet. B

Plate 23, figures 8-11

Spumellaria gen. and sp. indet. D

CARTER, 1993, p. 92, pl. 13, figs. 12, 13

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.)- Rhaetian.

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Ankara Ophiolitic Melange, Eryaman, Ankara and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

SUBORDER **ENTACTINARIA** KOZUR & MOSTLER, 1982

FAMILY **AUSTRISATURNALIDAE** KOZUR & MOSTLER,1983

SUBFAMILY **HUNGAROSATURNALINAE** KOZUR & MOSTLER, 1983

Genus ***Hungarosaturnalis*** KOZUR & MOSTLER,1983 emend. MOSTLER & KRAINER, 1994

Hungarosaturnalis KOZUR AND MOSTLER

KOZUR AND MOSTLER, 1983, p. 7

emend. MOSTLER AND KRAINER, 1994, pp. 98-99

Type Species: *Hungarosaturnalis multispinosa* KOZUR & MOSTLER, 1983.

Hungarosaturnalis longobardica KOZUR & MOSTLER,1983

Plate 24, figure 1

Hungarosaturnalis longobardica KOZUR & MOSTLER

KOZUR & MOSTLER, 1983, p. 8, pl. 4, fig. 3; pl. 5, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (Base of late Ladinian- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Köveskal, Balaton Highland, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Hungarosaturnalis multispinosa KOZUR & MOSTLER, 1983

Plate 24, figure 2

Hungarosaturnalis multispinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1983, p. 8, pl. 4, fig. 1; pl. 5, fig. 5; pl. 6, fig. 1; pl. 7, figs. 2, 3.

GORICAN & BUSER, 1990, p. 147, pl. 1, fig. 5

MOSTLER & KRAINER, 1994, pl. 1, figs. 1-6; pl. 2, figs. 1-8; pl. 3, figs. 1-3, 7-8; pl. 12, figs. 2-6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (Base of late Ladinian- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Köveskal, Hungary; Vrsic, Slovenia; Karawank, Austria; Sugozu Measured

Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Hungarosaturnalis pileatus (NAKASEKO & NISHIMURA, 1979)

Plate 24, figure 3

Saturnosphaera pileata NAKASEKO & NISHIMURA

NAKASEKO & NISHIMURA 1979, p. 74, pl. 5, figs. 3a, b.

Hungarosaturnalis pileatus (NAKASEKO & NISHIMURA, 1979)

KOZUR & MOSTLER, 1983, p. 7

MOSTLER & KRAINER, 1994, pl. 7, figs. 4, 5, 7

NON SUGIYAMA, 1997, p. 181, fig. 48-27 (=*Hungarosaturnalis triassicus* (NAKASEKO & NISHIMURA, 1979))

Hungarosaturnalis cf. *pileatus* (NAKASEKO & NISHIMURA, 1979)

MOSTLER & KRAINER, 1994, pl. 7, fig. 6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Southwest Japan; Carinthia, Karawank, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Ornatisaturnalis*** MOSTLER & KRAINER, 1994

Ornatisaturnalis MOSTLER & KRAINER

MOSTLER & KRAINER, 1994, p. 103

Type Species: *Ornatisaturnalis ingridae* MOSTLER & KRAINER, 1994.

Ornatisaturnalis ingridae MOSTLER & KRAINER, 1994

Plate 24, figure 4

Ornatisaturnalis ingridae MOSTLER & KRAINER

MOSTLER & KRAINER, 1994, pp. 103-105, pl. 10, figs. 1-5

Praeheliostaurus ingridae (MOSTLER & KRAINER, 1994)

SUGIYAMA, 1997, p. 185, fig. 48-26

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Central Karawank, Austria; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Ornatisaturnalis quadrispinosus MOSTLER & KRAINER, 1994

Plate 24, figure 5

Ornatisaturnalis quadrispinosus MOSTLER & KRAINER

MOSTLER & KRAINER, 1994, pp. 105-106, pl. 10, figs. 13-14

Preaheliostraus levis KOZUR & MOSTLER

SUGIYAMA, 1997, p. 185, fg. 48-25

Range (this study): Late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Central Karawank, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **EPTINGIDAE** DUMITRICA,1978a

Genus ***Cryptostephanidium*** DUMITRICA, 1978a

Cryptostephanidium DUMITRICA

DUMITRICA, 1978a, p. 30

Type Species: *Cryptostephanidium cornigerum* DUMITRICA, 1978a.

Cryptostephanidium cornigerum DUMITRICA, 1978a

Plate 24, figure 6

Cryptostephanidium cornigerum DUMITRICA

DUMITRICA, 1978a, p. 31, pl. 1, figs. 1-4; pl. 4, fig. 4

GORICAN & BUSER, 1990, p. 142, pl. 8, figs. 1-3

YEH, 1990, pp. 22-23, pl. 5, figs. 11, 15; pl. 11, fig. 5

RAMOVS & GORICAN, 1995, p.184, pl. 5, fig. 3

KOZUR, KRAINER & MOSTLER, 1996, p. 207, pl. 10, fig. 12

Cryptostephanidium cf. *cornigerum* DUMITRICA

YAO, 1982, pl. 1, fig. 16

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Recoaro, Italy; Inuyama area, Central Japan; Zaklanec, Bohinj, Vojsko, Vrisic and Smarna Gora, Slovenia; Busuanga Island, Philippines; Carinthia, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Cryptostephanidium goncuoglui n. sp.

Plate 24, figures 7-8

Derivation of Name: This species is named for Prof. Dr. Cemal GONCUOGLU, Middle East Technical University, Ankara, Turkey, in honour of his contributions to the study of Turkish geology and nice comments on this study.

Holotype: The specimen on plate 24, figure 7. Sample 96-UKT-530. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 15 specimens.

Description: Shell subspherical, surface of the cephalis covered by large, polygonal (mainly trigonal to hexagonal) and irregular pore frames. Horns mainly unequal, sometimes apical horn (A) a little bit longer than two lateral horns (L) and have angle with these two L much bigger than angle between these two L. Horns triradiate with very wide grooves and thin ridges. Horns proximally wide then tapering distally. Distal part of A always slightly twisted and mainly straight, sometimes one of them loosely twisted.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Diameter of cephalis	78	78	83	80.5
Length of horn	73	73	84	80

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Cryptostephanidium goncuoglui* n. sp. differs from *C. cornigerum* DUMITRICA by having wider and twisted horns.

Genus ***Pylostephanidium*** DUMITRICA, 1978a

Pylostephanidium DUMITRICA

DUMITRICA, 1978a, p. 34

Type species: *Pylostephanidium clavator* DUMITRICA, 1978a.

Pylostephanidium ankaraense BRAGIN & TEKIN, 1996

Plate 24, figures 9-11

Pylostephanidium ankaraense BRAGIN & TEKIN

BRAGIN & TEKIN, 1996, pp. 117, 119, pl. 1, figs. 1-5

Range (this study): Late Triassic; late Norian.

Total Range (this study and published): Late Triassic; late Norian.

Occurrence: Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey.

FAMILY **HEXAPOROBRACHIIDAE** KOZUR & MOSTLER, 1979

Genus ***Tetraporobrachia*** KOZUR & MOSTLER, 1979

Tetraporobrachia KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 78
Type species: *Tetraporobrachia haeckeli* KOZUR & MOSTLER 1979.

Tetraporobrachia composita CARTER, 1993
Plate 25, figure 1

Tetraporobrachia composita CARTER
CARTER, 1993, p. 90, pl. 12, figs. 7, 10, 11
BRAGIN & TEKIN, 1996, pl. 3, fig. 5
Range (this study): Late Triassic; late Norian.
Total Range (this study and published): Late Triassic; late Norian.
Occurrence: Queen Charlotte Island, British Columbia, Canada; Ankara Ophiolitic Melange, Eryaman, Ankara, Turkey.

Tetraporobrachia haeckeli KOZUR & MOSTLER, 1979
Plate 25, figure 2

Tetraporobrachia haeckeli KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 79, pl. 4, fig. 6; pl. 5, figs. 1, 2
LAHM, 1984, pp. 26-27, pl. 3, fig. 4
Range (this study): Late Triassic; middle Carnian.
Total Range (this study and published): Late Triassic; middle Carnian.
Occurrence: Gostling and Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

FAMILY **MULTIARCUSELLIDAE** KOZUR & MOSTLER, 1979

SUBFAMILY **TRIARCELLINAE** KOZUR & MOCK, 1981

Genus ***Triarcella*** KOZUR & MOCK, 1981

Triarcella KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 26
Type species: *Triarcella sulovensis* KOZUR & MOCK, 1981.

Triarcella sulovensis KOZUR & MOCK, 1981
Plate 25, figures 3-4

Triarcella sulovensis KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 26, pl. 62, figs. 1-4
Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).
Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).
Occurrence: Westkarpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **SPONGOSATURNALOIDIDAE** KOZUR & MOSTLER, 1983

Genus ***Spongosaturnaloides*** KOZUR & MOSTLER, 1972

Spongosaturnaloides KOZUR & MOSTLER
KOZUR & MOSTLER, 1972, p. 42
Type species: *Spongosaturnalis (Spongosaturnolides) quinquespinosa* KOZUR & MOSTLER, 1972.

Spongosaturnaloides multidentatus KOZUR & MOSTLER, 1983
Plate 25, figure 5

Spongosaturnaloides multidentatus KOZUR & MOSTLER
KOZUR & MOSTLER, 1983, p. 11, pl. 3, fig. 1
Range (this study): Late Triassic; middle Carnian.
Total Range (this study and published): Late Triassic; middle Carnian.
Occurrence: Göstling, Austria; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

FAMILY **HINDEOSPHAERIDAE** KOZUR & MOSTLER,1981

Genus ***Hindeosphaera*** KOZUR & MOSTLER, 1979

Hindeosphaera KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 61-62

Type Species: *Hindeosphaera foremanae* KOZUR & MOSTLER, 1979.

Hindeosphaera bispinosa KOZUR & MOSTLER,1979

Plate 25, figures 6-7

Hindeosphaera bispinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 63-64, pl. 2, fig. 6

KOZUR & MOSTLER, 1981, p. 29, pl. 67, fig. 1

LAHM, 1984, p. 38, pl. 6, figs. 1, 2

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; early Carnian- middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Westkarpats; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Genus ***Pseudostylosphaera*** KOZUR & MOSTLER, 1981

Pseudostylosphaera KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, pp. 30-31

Type species: *Pseudostylosphaera gracilis* KOZUR & MOSTLER, 1981.

Pseudostylosphaera coccostyla (RÜST, 1892)
Pseudostylosphaera coccostyla coccostyla (RÜST, 1892)

Plate 25, figure 8

Spongotractus coccostylus RÜST

RÜST, 1892, p. 160, pl. 21, fig. 8

Pseudostylosphaera coccostyla KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 32, pl. 15, fig. 3; pl. 46, fig. 5

Pseudostylosphaera coccostyla coccostyla (RÜST, 1892)

KOZUR & MOSTLER, 1994, p. 44

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Felsöörs, Balaton highland, Hungary; Silz, Austria; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Pseudostylosphaera goestlingensis (KOZUR & MOSTLER, 1979)

Plate 25, figure 9

Stylosphaera ? goestlingensis KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 59, pl. 17, fig. 5; pl. 18, fig. 1

Pseudostylosphaera goestlingensis (KOZUR & MOSTLER, 1979)

KOZUR & MOSTLER, 1981, p. 31

SUGIYAMA, 1997, p. 186, fig. 48-19

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.)

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./? *P. priscus* Rad. Subz.)- late Triassic; middle Carnian.

Occurrence: Göstling, Austria; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Pseudostylosphaera gracilis KOZUR & MOCK, 1981

Plate 25, figures 10-11

Pseudostylosphaera gracilis KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 32, pl. 66, fig. 1

SUGIYAMA, 1997, p. 186, fig. 48-18

Pseudostylosphaera hellenica (DE WEVER, 1979)

LAHM, 1984, p. 35, pl. 5, figs. 1, 2

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Westkarpats, Gostling and Grossreifling, Austria; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Pseudostylosphaera hellenica (DE WEVER, 1979)

Plate 25, figure 12

Archaeospongoprunum ? *hellenicum* DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 78, pl. 1, fig. 8

DE WEVER, 1982, pp. 179-180, pl. 10, fig. 4 **NON** 5, 6.

NON TAKASHIMA & KOIKE, 1982, pl. 2, figs. 7-8(=*Pseudostylosphaera imperspicua* (BRAGIN, 1986))

Stylosphaera ? cf. *hellenica* (DE WEVER, 1979)

NON KOZUR & MOSTLER, 1979, p. 55, pl. 1, fig. 4; pl. 17, fig. 4

Pseudostylosphaera hellenica (DE WEVER, 1979)

KOZUR & MOSTLER, 1981, p. 31

NON LAHM, 1984, p. 35, pl. 5, figs. 1, 2 (= *P. gracilis* KOZUR & MOCK, 1981)

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; early Carnian- middle Carnian.

Occurrence: Karpenission, Tourla, Greece; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Pseudostylosphaera imperspicua (BRAGIN, 1986) n. comb.

Plate 25, figure 13

Archaeospongoprunum cf. *hellenicum* DE WEVER

TAKASHIMA & KOIKE, 1982, pl. 2, figs. 7-8

Archaeospongoprunum ? *imperspicuum* BRAGIN

BRAGIN, 1986, p. 71, pl. 2, fig. 9

Stylosphaera imperspicua (BRAGIN, 1986)

BRAGIN, 1991a, p. 90, pl. 5, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Sahalin, Japan; Sikhote Alyn, Koryak range, Fareast Russia; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Pseudostylosphaera longispinosa KOZUR & MOSTLER, 1981

Plate 25, figure 14

Pseudostylosphaera longispinosa KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 32, pl. 1, fig. 6

LAHM, 1984, pp. 34-35, pl. 4, fig. 11, 12

GORICAN & BUSER, 1990, p. 155, pl. 5, figs. 3-5

?YEH, 1990, p. 15, pl. 4, fig. 2

SUGIYAMA, 1997, p. 186, fig. 48-16

Pseudostylosphaera longobardica KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 33, pl. 49, fig. 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- ? late Triassic; ? early Carnian.

Occurrence: Recoaro, Italy; Saalfalden, Austria; Busuanga Island, Philippines; Slovenia; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Pseudostylosphaera nazarovi (KOZUR & MOSTLER, 1979)
Plate 25, figure 15

Stylosphaera ? nazarovi KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 55, pl. 1, fig. 5; pl. 14, figs. 4, 6
Pseudostylosphaera nazarovi (KOZUR & MOSTLER, 1979)
KOZUR & MOSTLER, 1981, p. 31
SUGIYAMA, 1997, p. 186, fig. 48-17

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian- late Triassic; middle Carnian.

Occurrence: Göstling, Austria; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **MUELLITORTIDAE** KOZUR, 1988a

Genus ***Muelleritortis*** KOZUR, 1988a

Muelleritortis KOZUR
KOZUR, 1988a, p. 52

Type species: *Emiluvia ? cochleata* NAKASEKO & NISHIMURA, 1979.

Muelleritortis bosniensis KOZUR & MOSTLER, 1996b
Plate 26, figure 1

Muelleritortis bosniensis KOZUR & MOSTLER
KOZUR & MOSTLER, 1996b, p. 88, pl. 2, figs. 7, 11

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Fojnica, Bosnia-Hercegowina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Muelleritortis cive SUGIYAMA, 1997
Plate 26, figures 2-3

Muelleritortis cive SUGIYAMA
SUGIYAMA, 1997, p. 161, figs. 41- 19, 20

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes,Gazipasa, Antalya, Turkey.

Muelleritortis cochleata (NAKASEKO & NISHIMURA, 1979)
Muelleritortis cochleata cochleata (NAKASEKO & NISHIMURA, 1979)
Plate 26, figures 4-5

Emiluvia ? cochleata NAKASEKO & NISHIMURA
NAKASEKO & NISHIMURA, 1979, p. 70, pl. 3, figs. 2-4, 6
NISHIZONO, OHISHI, SATO & MURATA, 1982, pl. 1, fig. 19
Muelleritortis cochleata cochleata (NAKASEKO & NISHIMURA, 1979)
KOZUR, 1988a, p. 53, pl. 1, figs. 1-8; pl. 2, figs. 1-2; pl. 3, fig. 1
DOSZTALY, 1991, pl. 5, fig. 1
KOZUR & MOSTLER, 1996b, pl. 1, fig. 9
Muelleritortis cf. *cochleata cochleata* (NAKASEKO & NISHIMURA, 1979)
KOZUR & MOSTLER, 1996b, pl. 3, fig. 1
Muelleritortis cochleata (NAKASEKO & NISHIMURA, 1979)
SUGIYAMA, 1997, p. 183, fig. 27-11

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Southwest and Central Japan; Köveskal, Hungary; Fojnica, Bosnia-Hercegowina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Muelleritortis cochleata koeveskalensis KOZUR, 1988a

Plate 26, figure 6

Muelleritortis cochleata koeveskalensis KOZUR

KOZUR, 1988a, pp. 53-54, pl. 3, fig. 3

KOZUR & MOSTLER, 1996a, pl. 2, figs. 1, 8

Muelleritortis cf. *cochleata koeveskalensis* KOZUR

KOZUR & MOSTLER, 1996a, p. 87, pl. 2, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: Köveskal, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Muelleritortis cochleata tumidospina KOZUR, 1988a

Plate 26, figure 7

Emuluvia (?) aff. *cochleata* NAKASEKO AND NISHIMURA

BRAGIN, 1986, pl. 2, fig. 8

Muelleritortis cochleata tumidospina KOZUR

KOZUR, 1988a, p. 54, pl. 3, fig. 2

DOSZTALY, 1991, pl. 4, fig. 5

KOZUR AND MOSTLER, 1996a, pp. 87-88

Plafkerium cochleatum (NAKASEKO AND NISHIMURA, 1979)

BRAGIN, 1991a **ONLY** pl. 4, fig. 10

Plafkerium spp.

YEH, 1992, p. 61, **ONLY** pl. 7, fig. 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *P. priscus* Rad. Subz.- *M. cochleata*/ *S. fluegeli* Rad. Subz.).

Occurrence: Fareast Russia; Köveskal, Hungary; Uson Island, Philippines; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Muelleritortis expansa KOZUR AND MOSTLER, 1996b

Plate 26, figure 8

?*Emiluvia* ? *cochleata* NAKASEKO AND NISHIMURA

NISHIZONO AND MURATA, 1983, pl. 2, fig. 7

Muelleritortis expansa KOZUR AND MOSTLER

KOZUR AND MOSTLER, 1996b, p. 88, pl. 1, figs. 1-5, 8

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *P. priscus* Rad. Subz.)- late Triassic; earliest Carnian (Base of the *T. kretaensis* Rad. Z.).

Occurrence: ?Japan; Fojnica, Bosna-Hercegowina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Muelleritortis longispinosa KOZUR, 1988a

Plate 26, figures 9-10

Muelleritortis longispinosa KOZUR

KOZUR, 1988a, p. 54, pl. 3, fig. 4

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Köveskal, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Pentatortis*** KOZUR, 1988b

Pentatortis KOZUR

KOZUR, 1988b, p. 97

Type species: *Pentatortis longobardica* KOZUR, 1988b.

***Pentatortis* sp. A**

Plate 26, figure 11

Brief Definition: Cortical shell subglobular. Pore frames of outer layer elevated with nodes at vertices. The five main spines slightly widened distally situated in the same plane. Twisted main spines with wide grooves and wide ridges. Untwisted main spines longer than the twisted ones.

Measurements (μm):

(Based on the 1 specimen)

Diameter of cortical shell	120
Length of untwisted main spines	115
Length of twisted main spines	85-100

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: It differs from *Pentatortis hexaspina* KOZUR & MOSTLER by possessing five main spines (instead of six) situated in the same plane.

Genus ***Tritortis*** KOZUR, 1988b

Tritortis KOZUR

KOZUR, 1988b, pp. 97-98

Type species: *Sarla* ? *kretaensis* KOZUR & KRAHL, 1984.

Tritortis ariana (CORDEY et al., 1988) Group

Plate 27, figure 1

Sarla ariana CORDEY et al.

CORDEY, DE WEVER, DUMITRICA, DANELIAN, KITO & VRIELYNCK, 1988, pp. 32-33, pl. 1, figs. 8-11

Tritortis sp. cf. *T. ariana* (CORDEY et al., 1988)

SUGIYAMA, 1997, p. 188

Range (this study): Middle Triassic; latest Ladinian (Top of the *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; latest Ladinian (Top of the *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Remarks: It includes forms which have both long and short main spines.

Tritortis balatonica KOZUR, 1988a, b

Plate 27, figure 2

Tritortis balatonica KOZUR

KOZUR, 1988a, b, p. 99, pl. 3, fig. 8; pl. 4, fig. 7

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.)

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.)

Occurrence: Köveskal, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Tritortis kretaensis (KOZUR & KRAHL, 1984)

Tritortis kretaensis dispiralis (BRAGIN, 1986)

Plate 27, figure 3

Tripocyclia sp.

NISHIZONO, OHISHI, SATO & MURATA, 1982, pl. 1, fig. 15

Tripocyclia sp. A

NISHIZONO & MURATA, 1983, pl. 2, fig. 6

Sarla dispiralis BRAGIN

BRAGIN, 1986, p. 67, pl. 1, fig.12

BRAGIN, 1991a, p. 79, pl. 4, fig. 11, pl. 5, fig. 8 **NON** pl. 4, fig. 6

Sarla ? *kretaensis* KOZUR & KRAHL

CORDEY, DE WEVER, DUMITRICA, DANELIAN, KITO & VRIELYNCK, 1988, p. 34, pl. 2, fig. 7 **NON** figs. 9-11 (=*Tritortis kretaensis kretaensis* (KOZUR & KRAHL, 1984))

Tritortis kretaensis subcylindrica KOZUR

KOZUR, 1988a, b, pp. 98-99, pl. 4, figs. 6, 8

Tritortis kretaensis robusta DOSZTALY

DOSZTALY, 1991, p. 197, pl. 1, figs. 1, 2

Tritortis kretaensis dispiralis (BRAGIN, 1986)

KOZUR & MOSTLER, 1996a, pp. 91-92, pl. 3, fig. 11

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Kyushu, Japan; far east Russia; British Columbia, Canada; Darnohegy-Gebeit, Northeast Hungary; Fojnica, Bosnia-Hercegowina; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Tritortis kretaensis kretaensis (KOZUR & KRAHL, 1984)

Plate 27, figures 4-5

Sarla ? *kretaensis* KOZUR & KRAHL

KOZUR & KRAHL, 1984, pp. 401-402, pl. 1, figs. 3, 4

CORDEY, DE WEVER, DUMITRICA, DANELIAN, KITO & VRIELYNCK, 1988, pl. 2, figs. 9-11 **NON** pl. 2, fig. 7 (=*Tritortis kretaensis dispiralis* (BRAGIN, 1986))

Tritortis kretaensis kretaensis (KOZUR & KRAHL, 1984)

KOZUR, 1988a, b, p. 98, pl. 4, figs. 3-5

Tritortis kretaensis (KOZUR & KRAHL, 1984)

SUGIYAMA, 1997, p. 188, fig. 48-21

Range (this study): Middle Triassic; latest Ladinian (Top of the *M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Total Range (this study and published): Middle Triassic; latest Ladinian (Top of the *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: West Kreta-Greece; British Columbia, Canada; Köveskal, Hungary; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **PENTACTINOCARPIDAE** DUMITRICA, 1978b emend. KOZUR & MOSTLER, 1981

Genus ***Pentactinocarpus*** DUMITRICA, 1978b

Pentactinocarpus DUMITRICA

DUMITRICA, 1978b, p. 43

Oertlisphaera KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 53

? *Praedruppatractylis* KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 82

Type species: *Pentactinocarpus fusiformis* DUMITRICA, 1978b.

Pentactinocarpus acanthicus DUMITRICA, 1978b

Plate 27, figure 6

Pentactinocarpus acanthicus DUMITRICA

DUMITRICA, 1978b, pp. 44-45, pl. 3, fig. 3

DUMITRICA, KOZUR & MOSTLER, 1980, p. 7, pl. 4, fig. 7

LAHM, 1984, pp. 22-23, pl. 2, figs. 9-10

GORICAN & BUSER, 1990, p. 149, pl. 7, fig. 12

KOZUR & MOSTLER, 1994, p. 46, pl. 2, figs. 3, 5

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Middle Triassic; early Ladinian- late Triassic; middle Carnian.

Occurrence: Recoaro, North Italy; Rarau, Eastern Karpats, Rumenia; Grossreifling,

Austria; Bohinj, Slovenia; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Pentactinocarpus sevaticus KOZUR & MOSTLER, 1981

Plate 27, figures 7-8

Pentactinocarpus sevaticus KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, pp. 21-22, pl. 52, fig. 3, pl. 53, fig, 5, pl. 55, fig. 1

? SUGIYAMA, 1997, p. 184, fig. 50-7

Pentactinocarpus sp. cf. *P. sevaticus* KOZUR & MOSTLER

CARTER, 1993, p. 40, pl. 1, figs. 11, 15; pl. 21, figs. 15, 17

BRAGIN & TEKIN, 1996, pl. 3, fig. 1

Range (this study): Late Triassic; late Norian-Rhaetian.

Total Range (this study and published): Late Triassic; middle Norian?- late Norian- Rhaetian.

Occurrence: Pötschenpass, Austria; Queen Charlotte Islands, British Columbia, Canada; Ankara Ophiolitic Melange, Eryaman, Ankara and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey; Mino Terrane, Central Japan.

Pentactinocarpus tetracanthus DUMITRICA, 1978.b

Plate 27, figures 9-10

Pentactinocarpus tetracanthus DUMITRICA

DUMITRICA, 1978b, p. 44, pl. 2, fig. 1

DUMITRICA, KOZUR & MOSTLER, 1980, p. 8, pl. 4, figs. 1-4

LAHM, 1984, p. 23, pl. 2, fig. 11

GORICAN & BUSER, 1990, p. 150, pl. 7, figs. 8-10

KOZUR & MOSTLER, 1994, p. 47, pl. 2,figs. 6-7

KELLICI & DE WEVER, 1995, p. 153, pl. 3, fig. 20

SUGIYAMA, 1997, p. 184, fig. 49-23

Sethophaena ? sp. A

NAKASEKO & NISHIMURA, 1979, p. 79, pl. 8, fig. 7 **NON** fig. 8

Pentactinocarpus cf. *tetracanthus* DUMITRICA

NON LAHM, 1984, p. 24, pl. 2, fig. 12

Pentactinocarpus bispinosus KOZUR & MOCK

LAHM, 1984, p. 24, pl. 2, fig. 13

Range (this study): late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Recaoro, San Uldrico and Marmolada Massif, Italy; Southwest and Central Japan; Göstling, Austria; Bohinj and Vosko, Slovenia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

ENTACTINARIA INCERTAE SEDIS

Genus *Braginella* SUGIYAMA, 1997

Braginella SUGIYAMA

SUGIYAMA, 1997, p. 146

Type species: *Pentactinosphaera rudis* BRAGIN, 1986.

Braginella rudis (BRAGIN, 1986)

Plate 27, figures 11-12

Pentactinosphaera rudis BRAGIN

BRAGIN, 1986, p. 69, pl. 1, figs. 14

BRAGIN, 1991a, p. 82, pl. 8, figs.1-5

BRAGIN & TEKIN, 1996, pl. 3, figs. 2-4, 6

Spumellaria gen. and sp. Indet. B

CHENG, 1989, p. 147, pl. 10, figs. 9-10, 13-14

Braginella rudis (BRAGIN, 1986)

SUGIYAMA, 1997, p. 146, figs. 39-19, 40-2-3b

Range (this study): Late Triassic; late Norian-Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Sahalin, Fareast Russia; Busuanga Islands, Philippines; Ankara Ophiolitic Melange, Eryaman, Ankara; Turkey; Mino Terrane, Central Japan.

SUBORDER **NASSELARIINA** EHRENBERG, 1875 (FAMILY NAME IN ALPHABETICAL ORDER)

FAMILY **BULBOCYRTIDAE** KOZUR & MOSTLER, 1981

Genus ***Bulbocyritium*** KOZUR & MOSTLER, 1981 emend. herein.

Bulbocyritium KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 106
Quasipetatus BLOME
BLOME, 1984, p. 57

Type species: *Bulbocyritium reticulatum* KOZUR & MOSTLER, 1981.

Emended Diagnose: Test multicyritid, sometimes possesses four post-abdominal segments.

Bulbocyritium dryites SUGIYAMA, 1997
Plate 28, figures 1-2

Bulbocyritium dryites SUGIYAMA
SUGIYAMA, 1997, p. 146, fig. 37-9

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Bulbocyritium globosus n. sp.
Plate 28, figures 3-4

Derivation of Name: Due to its globular cephalis.

Holotype: The specimen on plate 28, figure 3. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 7 specimens.

Description: Test multicyritid, cephalis large, bulbous, wide without horn, double layered, outer layer comprised of coarse variably sized, polygonal pore frames with nodes at pore frame vertices, nodes relatively high in relief; inner layer with smaller, uniformly sized, polygonal pore frames with large, circular to subcircular pores. Collar stricture distinct marked by deep depression and abrupt changing in the shape of form. Thorax, abdomen and first post-abdominal segments hoop-like with rare irregular circular to elliptical pores. The width of the thorax, abdomen and post-abdominal segments approximately same in size giving a uniform slender outline in this part to form. Lumbar stricture and subsequent strictures distinctive marked by moderately deep depressions without pores. Second post-abdominal segment, imperforate and widened distally.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	102	100	102	101
Width of cephalis	133	126	133	129.5
Length of thorax	20	20	30	25
Width of thorax	67	67	70	68.5
Length of abdomen	23	23	23	23
Width of abdomen	67	67	73	70
Total length of form	233	217	233	225
Width of distal end	123	116	123	119.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It could be distinguished from both *Bulbocyritium insolitus* (BLOME) and *B. reticulatum* KOZUR & MOSTLER by possessing more amount segments, less wider thorax, abdomen and first post-abdominal segments, longer test and wider distal end.

Bulbocyritium insolitus (BLOME, 1984) n. comb.
Plate 28, figure 5

Unnamed Hat-Shaped Nassellarian

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, p. 69, pl. 5, figs. 1-2

Quasipetatus insolitus BLOME

BLOME, 1984, p. 58, pl. 16, figs. 2, 8,12; pl. 17, fig. 17

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.)- ? late Middle Norian.

Occurrence: Baja California Sur, Mexico; East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Bulbocyritium* KOZUR (1984a, Jenuary) is the senior synonym of *Quasipetatus* BLOME (1984, April).

Bulbocyritium reticulatum KOZUR & MOSTLER, 1981

Plate 28, figures, 6-7

Bulbocyritium reticulatum KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, pp. 106-107, pl. 11, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **CANOPTIDAE** PESSAGNO, 1979

Genus ***Canoptum*** PESSAGNO, 1979

Canoptum PESSAGNO

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pp. 182, 184

Type species: *Canoptum poissoni* PESSAGNO, 1979.

Canoptum cucurbita (SUGIYAMA, 1997) n. comb., emend. herein

Plate 28, figures 8-9

Canesium (?) *cucurbita* SUGIYAMA

SUGIYAMA, 1997, p. 147, figs. 37- 7, 8

Emended Description: Test roughly spindle-shaped with mainly 4 post-abdominal segments and completely covered by microgranular silica. Cephalis small hemispherical, collar stricture indistinct. Test quickly widening until first post-abdominal segment then width of test become constant until third post-abdominal segment, last post-abdominal segment slightly decreasing in width. Thorax to abdomen subtrapezoidal, first to third post-abdominal segments hoop-like and last post-abdominal segment inverse subtrapezoidal in outline. Lumbar stricture more prominent than collar stricture, the other strictures between post-abdominal segments so distinct always marked by deep depressions. Many small circular pores present at the surface of the test

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: Complete specimens from Sugozu Measured Section indicate that tests have at least four post-abdominal segments, total length of the test could reach up to 255 µm and this species should belongs to genus *Canoptum* PESSAGNO.

Canoptum inornatus n. sp.

Plate 28, figures 10-12

Derivation of Name: From the Latin *inornatus*= non ornate.

Holotype: The specimen on plate 28, figure 10. Sample 96-UKT-559. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 11 specimens.

Description: Test long, slender with mainly five post-abdominal segments and completely covered by microgranular silica. Cephalis small and dome-shaped, collar stricture indistinct. The width of the test from abdomen to first post-abdominal segment approximately same, all these segments hoop-like then second post-abdominal segment abruptly widening again hoop-like and last three post-abdominal segments decreasing in width slowly and inverse subtrapezoidal in outline. Lumbar stricture and subsequent strictures mainly marked by small depressions. In some cases, when the microgranular silica accretion not much, row of pores visible at the strictures. Surface of test has many scattered small, circular to semicircular pores.

Measurements (μm):

(Based on the 2 specimens, only one of them is complete)

	HT	Min.	Max.	Av.
Length of cephalis	30	27	30	28.5
Width of cephalis	35	35	40	37.5
Length of thorax	45	40	45	42.5
Width of thorax	50	50	60	55
Length of abdomen	55	55	85	70
Width of abdomen	52	52	60	56
Total length of test	320	-	-	320
Max. width of the test	80	80	87	83.5

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Canoptum inornatus* n. sp. differs from both *C. levis* n. sp. and *C. cucurbita* (SUGIYAMA) by having slender proximal part until second post-abdominal segment.

Canoptum levis n. sp.

Plate 28, figures 13-15

Derivation of Name: From the Latin *levis* = Smooth.

Holotype: The specimen on plate 28, figure 13. Sample 96-UKT-544. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: More than 100 specimens.

Description: Test roughly spindle-shaped with mainly four post-abdominal segments and completely covered by microgranular silica. Cephalis small and dome-shaped, collar stricture indistinct. Test slowly widening at thorax, trapezoidal in outline, abdomen and first post-abdominal segments slightly wider than thorax, hoop-like in outline. Test reaching maximum width at second and third post-abdominal segments both hoop-like and last post-abdominal segment decreasing in width very quickly and inverse subtrapezoidal in outline. Lumbar stricture and subsequent strictures mainly marked by small depressions. In some cases, when the microgranular silica accretion not much, pores of row of pores visible at the strictures (e.g. strictures between first and second post-abdominal segments). Surface of test has many scattered, small, circular to semicircular pores.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	16	23	21
Width of cephalis	33	29	33	31.5
Length of thorax	40	32	40	35.5
Width of thorax	53	43	53	49.5
Length of abdomen	53	40	53	47.5
Width of abdomen	73	67	73	71
Total length of test	257	253	286	265
Max. width of the test	97	93	106	98.5

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Canoptum levis* n. sp. differs from *C. cucurbita* (SUGIYAMA) by having slight widening at the proximal part (instead of abrupt widening) and test reaches maximum inflation at second sometimes third post-abdominal segments instead of first post-abdominal segment. It has been compared to *Canoptum inornatum* n. sp. under latter species.

Canoptum rhaeticum KOZUR & MOSTLER, 1981

Plate 29, figures 1

Canoptum rhaeticum KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, pp. 103-104, pl. 20, figs. 1-4
KOZUR & MOSTLER, 1990, pp. 219-220
SUGIYAMA, 1997, p. 175, fig. 50-5
Canoptum triassicum YAO
YAO, 1982, p. 60, pl. 3, figs. 3-4
YAO, MATSUOKA & NAKATANI, 1982, pl. 2, fig. 1
BRAGIN, 1986, pl. 3, fig. 5
BRAGIN, 1991a, p. 102, pl. 7, figs. 1, 5
YEH & CHENG, 1996, p. 11, pl. 3, fig. 5
?*Canoptum* sp. cf. *C. triassicum* YAO
CARTER, 1993, p. 105, pl. 18, figs. 11, 12, 13

Range (this study): Late Triassic; late Norian-Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Zlambachgraben, Austria; Inuyama area and Mino Terrane, Central Japan; Sahalin, Fareast Russia; ?Queen Charlotte Islands, British Columbia, Canada; Busuanga Island, Philippines; Ankara Ophiolitic Melange, Eryaman, Ankara and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Canoptum sp. aff. *C. unicum* PESSAGNO & WHALEN, 1982

Plate 29, figure 2

aff. *Canoptum unicum* PESSAGNO & WHALEN
PESSAGNO & WHALEN, 1982, p. 125, pl. 1, figs. 5, 14, 19, 23; pl. 12, fig. 4
Canoptum sp. aff. *C. unicum* PESSAGNO & WHALEN
CARTER, 1993, p. 105, pl. 18, fig. 10

Range (this study): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus *Japonocampe* KOZUR, 1984a

Japonocampe KOZUR
KOZUR, 1984a, p. 72
Latium BLOME
BLOME, 1984, pp. 54-55

Type species: *Triassocampe nova* YAO, 1982.

Japonocampe nova (YAO, 1982) Group

Plate 29, figures 3-5

Dictyomitrella sp. B
YAO, MATSUDA & ISOZAKI, 1980, pl. 3, figs. 1-3
Triassocampe nova YAO
YAO, 1982, pp. 59-60, pl. 2, figs. 1-4.
YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 14
BRAGIN, 1986, pl. 3, fig. 4
YOSHIDA, 1986, pl. 4, figs. 7, 8
BRAGIN, 1991a, p. 101, pl. 5, figs. 12, 16
NON BLOME & REED, 1995, p. 62, pl. 2, fig. 17
Japonocampe nova (YAO, 1982)
KOZUR, 1984a, p. 72
SUGIYAMA, 1997, p. 181, fig. 50-1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- middle Norian.

Occurrence: Inuyama Area, Gifu Prefecture and Mino Terrane, Central Japan; Sahalin, Sikhote-Alin, Fareast Russia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Group includes forms which have both wider inflated circumferential ridges and less wider, less inflated circumferential ridges.

Genus ***Pachus*** BLOME, 1984 emend. herein

Pachus BLOME

BLOME, 1984, p. 48

Type species: *Pachus firmus* BLOME, 1984.

Emended definition: Included forms with or without apical horn. Rows of nodes on the circumferential ridges could reach to six.

Remarks: As it is going to be explained at *Pachus multinodosus* n. sp., circumferential ridges become wider and amount of the rows of nodes sometimes reach to six at the third post-abdominal segment.

Pachus firmus BLOME, 1984
Plate 29, figure 7

Pachus firmus BLOME

BLOME, 1984, p. 49, pl. 12, figs. 3, 4, 8, 9 15, 17; pl. 17, fig. 8

? SUGIYAMA, 1997, p. 183, fig. 50-6

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; ?Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Pachus longinquus BLOME, 1984
Plate 29, figure 8

Pachus longinquus BLOME

BLOME, 1984, pp. 49-50, pl. 12, figs. 6, 11, 13, 14; pl. 17, fig. 9

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Pachus multinodosus n. sp.
Plate 29, figures 9-12

? *Canesium* ? sp.

OTSUKA, KAJIMA & HORI, 1992, pl. 3, fig. 13

Derivation of Name: Because of its many rows of nodes on the circumferential ridges.

Holotype: The specimen on plate 29, figure 9. Sample 97-UKT-133. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Test as for genus. In general, test conical with four post-abdominal segments. Cephalis small and dome-shaped without nodes and horn. Collar stricture indistinct covered by microgranular silica. Thorax hoop-like, bigger than cephalis, some remnants of nodes visible on its surface. Lumbar stricture more distinct marked by deep depression again mainly covered by microgranular silica. Subsequent strictures all well-marked by deep depressions with one row of circular pores (18-20 pores visible at one side of test, laterally). Abdomen and subsequent segments increasing in width distally and all hoop-like. All these segments bears small rows of nodes, varies two to six.

Measurements (μm):

(Based on the 6 specimen)

	HT	Min.	Max.	Av.
Length of cephalis	13	12.5	15	13.5
Width of cephalis	23	23	27	25
Length of thorax	17	17	22.5	18.5
Width of thorax	37	37	43	40.5
Length of abdomen	30	24	32.5	28
Width of abdomen	53	53	60	57
Total length of test	240	213	240	229
Max. width of test	110	100	110	107

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (Base of the *E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (Base of the *E. triangularis* Con. Z.).

Occurrence: ?Oman; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Pachus multinodosus* n. sp. differs all other species of the genus *Pachus* BLOME by having many rows of nodes (up to 6) on the wider circumferential ridges.

FAMILY **DEFLANDRECYRTIIDAE** KOZUR & MOSTLER, 1979

Genus ***Deflandrecyritium*** KOZUR & MOSTLER, 1979

Deflandrecyritium KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 96
Dreyercyrtium KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 97

Type species: *Deflandrecyritium popofskyi* KOZUR & MOSTLER, 1979.

Deflandrecyrtium breviora (SUGIYAMA, 1997) n. comb.
Plate 30, figures 1-2

Squinabolella (?) sp. C
YAO, 1982, pl. 3, fig. 8
YAO, MATSUOKA & NAKATANI, 1982, pl. 2, fig. 3
HORI, 1990, p. 581, fig. 8-2
?*Squinabolella* sp. D
CARTER, 1993, p. 103, pl. 17, fig. 8
Haeckelicyrtium breviora SUGIYAMA
SUGIYAMA, 1997, p.155, figs. 42-5-8

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Inuyama area and Mino Terrane, Central Japan; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This species is involved to genus *Deflanderecyrtium* KOZUR & MOSTLER due to presence of apical horn (KOZUR & MOSTLER, 1979, p. 96).

Deflandrecyritium curvatum (KOZUR & MOSTLER, 1979)
Plate 30, figure 3

Dreyercyritium curvatum KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 97, pl. 13, fig. 9
Deflandrecyritium curvatum (KOZUR & MOSTLER, 1979)
KOZUR & MOSTLER, 1981, p. 89, pl. 34, fig. 2; pl. 35, fig. 1

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Göstling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Deflandrecyrtium inaquiporatum n. sp.
Plate 30, figures 4-6

Derivation of Name: Due to its unequal pore organisation especially on the abdominal skirt.

Holotype: The specimen on plate 30, figure 4. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 20 specimens.

Description: Test large with three segments. Cephalis hemispherical, small, imperforate with apical horn. Horn thin, long, uniform and circular in axial section. Collar stricture less prominent only marked by a shallow depression. Thorax much broader, bonnet-shaped with circular to subcircular small pores. Abdomen flaring to wide skirt. Skirt has four rows of pores, much bigger than those of at thorax. Last row including 24-25 subcircular to subelliptical large pores. Distal end of rim has 24-25 triangular projections pointed distally.

Measurements (μm):
(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	40	35	50	41.5
Width of cephalis (distally)	65	55	75	65
Length of thorax	75	60	75	70
Width of thorax	150	120	150	137
Length of abdomen (incl. abdominal skirt)	100	100	125	108
Length of test (incl. horn)	290	285	290	287
Width of distal end	330	325	375	358

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Deflandrecyrtium inaquiporatum* n. sp. differs from *Deflandrecyrtium* sp. by having wider abdominal skirt with four rows of pores (instead of one row) and more amounts pores at the last row (24 instead of 20).

Deflandrecyrtium ithacanthum (SUGIYAMA, 1997) n. comb.
Plate 30, figures 7-8

Dreyericyrtium (?) sp.
YOSHIDA, 1986, pl. 8, figs. 5, 6
? *Deflandrecyrtium* sp. A
HORI, 1990, p. 581, fig. 8-1
Dreyericyrtium ithacanthum SUGIYAMA
SUGIYAMA, 1997, pp.151, 153, figs. 40-8-10

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Gifu Prefecture and Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: According to KOZUR & MOSTLER (1981, p. 89), genus *Deflandrecyritium* KOZUR & MOSTLER is the senior synonym of genus *Dreyercyrtium* KOZUR & MOSTLER.

Deflandrecyrtium parvus n. sp.
Plate 30, figures 9-10

Unnamed Nassellaria
PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pl. 5 **ONLY** fig. 6
Squinabolella (?) sp. B
YAO, 1982, pl. 2, fig. 20
Unnamed Nassellaria
YEH & CHENG, 1996, pl. 11, figs. (?) 1, (?) 2, (?) 12, 14 and 15
Haeckelicyrtium sp. A
SUGIYAMA, 1997, p.156, fig. 41-9

Derivation of Name: From the Latin *parvus*= Small.

Holotype: The specimen on plate 30, figure 9. Sample 98-UKT-48. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 12 specimens.

Description: Test with three segments. Cephalis subconical to subtriangular, short with rare pores. Apical horn short, thin and circular in axial section, slightly tapering distally with a blunt end. Collar stricture less prominent only marked by a shallow depression. Thorax much broader, bonnet-shaped with net-like hexagonal pore frames and small nodes at pore frame vertices. Pores large, mainly circular increasing in width distally. Short abdomen flaring to short disc-shaped abdominal skirt. Skirt smooth mainly without pores or with rare pores.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	30	20	30	25
Width of cephalis, (distally)	65	55	65	60
Length of thorax	105	80	105	95
Width of thorax	165	135	165	147
Length of abdomen (incl. abdominal skirt)	70	50	75	65
Length of test (including horn)	230	210	230	220
Width of distal end	175	175	205	188

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: Baja California Sur, Mexico; Inuyama Area and Mino Terrane, Central Japan; Busuanga Island, Philippines; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Deflandrecyrtium parvus* n. sp. differs from *D. pessagnoi* n. sp. by having shorter horn, subtriangular instead of hemispherical cephalis and shorter abdominal skirt mainly without pores. It could be distinguished all of the species of genus *Deflandrecyritium* KOZUR & MOSTLER by its small size.

Deflandrecyrtium pessagnoi n. sp.
Plate 30, figures 11-13

Derivation of Name: This species is named for Prof. Dr. Emile A. PESSAGNO, University of Texas at Dallas, USA, in honour of his great contributions to the knowledge of Mesozoic Radiolaria.

Holotype: The specimen on plate 30, figure 11. Sample 97-UKT-133. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 32 specimens.

Description: Test of three segments. Cephalis hemispherical, small, sparsely perforate with long apical horn. Horn thin, long, uniform and circular in axial section. Collar stricture less prominent. Thorax much broader, bonnet-shaped with net like hexagonal pore frames and mainly circular, medium to large sized pores. Short abdomen flaring to moderately long, disc-shaped abdominal skirt with a same pore frames as thorax, pores become wider to distal end. Rim of skirt smooth without any projections and pores.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	35	30	35	32.5
Width of cephalis (distally)	75	75	80	76.5
Length of thorax	90	85	90	87.5
Width of thorax	175	155	175	163
Length of Abdomen (incl. abdominal skirt)	80	80	100	90
Total length of test (including horn)	300	290	300	295
Width of distal end	275	240	290	268

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Deflandrecyrtium pessagnoi* n. sp. differs from *D. tegumentiformis* n. sp. by having wider cephalis and shorter abdominal skirt. It has been compared to *D. parvus* n. sp. under latter species.

Deflandrecyrtium takemurai (YEH & CHENG, 1996) n. comb.
Plate 31, figure 1

Haeckelicyrtium (?) sp. A
YAO, 1982, pl. 3, fig. 9
YAO, MATSUOKA & NAKATANI, 1982, pl. 2, fig. 4
Veghicyclia cf. *V. haeckeli* KOZUR & MOSTLER
YOSHIDA, 1986, pl. 17, fig. 12
Haeckelicyrtium takemurai YEH & CHENG
YEH & CHENG, 1996, pp. 12-13, pl. 5, figs. 5, 9, 13, 14

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Inuyama area and Gifu Prefecture, Central Japan; Busuanga Island, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This species is involved to genus *Deflanderecyrtium* KOZUR & MOSTLER due

to presence of apical horn (KOZUR & MOSTLER, 1979, p. 96).

Deflandrecyrtium tegumentiformis n. sp.

Plate 31, figures 2-3

Derivation of Name: From the Latin *tegumentiformis*= umbrella shaped

Holotype: The specimen on plate 31, figure 2. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 18 specimens.

Description: Test large with three segments. Cephalis subconical, small with a rare small pores and apical horn. Horn thin, long, uniform and circular in axial section. Collar stricture less prominent only marked by a shallow depression. Thorax much broader, bonnet-shaped with circular to subcircular pores in small to medium size. Abdomen gently flaring to disc-shaped abdominal skirt with net-like polygonal pore frames and subcircular to elliptical mainly medium to large sized pores. Pores become bigger medially then decreasing in width distally. Distal end of the skirt smooth without any projections.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	35	35	40	37.5
Width of cephalis (distally)	60	60	70	66
Length of thorax	80	70	80	75
Width of thorax	140	130	140	134.5
Length of abdomen (incl. abdominal skirt)	180	-	-	180
Total length of test (including horn)	370	-	-	370
Width of distal end	455	400	455	432

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Deflandrecyrtium tegumentiformis* n. sp. has been compared to *D. pessagnoi* n. sp. under latter species. It differs from *D.* sp. B by possessing disc-shaped instead of flat post-abdominal segment and smaller pore frames on post-abdominal skirt.

Deflandrecyrtium ? sp. A

Plate 31, figure 4

Brief Definition: Test with medium size abdominal skirt. Skirt has one row of subcircular to subelliptical large pores medially. Distal end of skirt possesses 20 triangular projections.

Measurements (μm):

(Based on the 1 specimen)

Width of distal end 330

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Deflandrecyrtium* ? sp. A has been compared to *D. inaquiporatum* n. sp. under latter species. It is tentatively assigned to genus *Deflandrecyrtium* KOZUR & MOSTLER due to probable presence of apical horn.

Deflandrecyrtium sp. B

Plate 31, figure 7

Brief Definition: Test with large mainly flat abdominal skirt. Skirt has different amount (3 to 5) rows of subcircular to subelliptical pores, increasing in width medially. Distal end of skirt smooth with undulations.

Measurements (μm):

(Based on the 2 specimens)

Max. width of distal end 455-560

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It has been compared to *D. tegumentiformis* n. sp. under latter species.

Genus ***Haeckelicyrtium*** KOZUR & MOSTLER, 1979

Haeckelicyrtium KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 98

Type species: *Haeckelicyrtium austriacum* KOZUR & MOSTLER, 1979.

Haeckelicyrtium subcircularis n. sp.
Plate 31, figures 5-6

Derivation of Name: Due to its subcircular outline of post-abdominal skirt.

Holotype: The specimen on plate 31, figure 5. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 4 specimens.

Description: Test with three segments. Cephalis small, conical, imperforate without horn. Collar stricture not distinctive only marked by shallow depression. Thorax bonnet-shaped with many circular to subcircular pores. Abdomen short, flaring to plate-shaped mainly flat abdominal skirt. Abdominal skirt has three to four rows of pores, moderately big and circular to elliptical proximally. Last row has 24 coarse ellipsoidal pores mainly perpendicular to distal rim. Rim of the abdominal skirt smooth without any projections.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	40	-	-	40
Width of cephalis, (distally)	55	47	55	51
Length of thorax	90	-	-	90
Width of thorax	130	120	130	125
Length of abdomen (incl. abdominal skirt)	25?	-	-	25?
Length of test	115	-	-	115
Width of distal end	410	410	414	412

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Haeckelicyrtium subcircularis* n. sp. could be distinguished from *H. austriacum* KOZUR & MOSTLER by having flat and wider abdominal skirt.

Genus ***Tricornicyrtium*** n. gen.

Type Species: *Tricornicyrtium dikmetasensis* n. gen., n. sp.

Derivatio nominis: Due to presence of three horns on apical part.

Description: Cephalis small, hemispherical with wide apical horn, two lateral horns and rare pores. Apical horn stout, triradiate with very wide grooves, thin ridges and blunt end. Lateral horns less wider, again triradiate with wide grooves and thin ridges. Collar stricture prominent, marked by moderate to deep depression and changing in shape. Thorax larger, bonnet-shaped with irregular pores, thorax decreasing in width distally, short abdomen gently flaring to abdominal skirt. The skirt relatively narrow has two or three rows of subcircular to ellipsoidal pores, pore sizes increasing distally. Skirt margin rimmed by thick ring.

Included Species:

Tricornicyrtium dikmetasensis n. gen., n. sp.

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Uson and Busuanga Islands, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: *Tricornicyrtium* n. gen. differs from genus *Deflandrecyritium* KOZUR & MOSTLER by having triradiate apical and two lateral horns. It is tentatively assigned to family Deflandrecyritidae KOZUR & MOSTLER due to this property. It may be transitional form between *Deflandrecyrtium* KOZUR & MOSTLER and *Dumitricaella* DE WEVER.

Tricornicyrtium dikmetasensis n. gen., n. sp.
Plate 31, figures 8-10

Nassellaria gen. and sp. Indet. F
CHENG, 1989, p. 149, pl. 10, figs. ? 15, 16
Nassellaria Indet. gen. C sp. B
YEH, 1992, p. 70, pl. 6, figs. 9-11

Derivation of Name: It is named after Dikmetas Village.

Holotype: The specimen on plate 31, figure 8. Sample 98-UKT-19. Deposited at MTA.

Type Locality: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey (See locality description).

Material: 11 specimens.

Description: Same as genus.

Measurements (μm):
(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	40	35	50	40
Width of cephalis (distally)	50	40	55	47.5
Length of thorax	67	67	110	82
Width of thorax	107	87	120	103.5
Length of abdomen (incl. abdominal skirt)	100	67	100	88
Total length of test (including horn)	245	200	270	239
Width of distal end	193	173	220	199

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian- Rhaetian.

Occurrence: Uson and Busuanga Islands, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey

Remarks: Same as genus.

FAMILY **HINEDORCIDAE** KOZUR & MOSTLER, 1981

Genus ***Alatipicapora*** n. gen.

Type Species: *Alatipicapora gediki* n. gen., n. sp.

Derivatio nominis: Due to similarity to genus *Picapora* KOZUR & MOSTLER and additional wing like extension on feet.

Description: Test dicyrtid, cephalis small to medium sized with strong apical and vertical horns. Horns triradiate with deep and wide grooves and thin ridges, apical horn slightly longer than vertical horn. Thorax larger, pyramidal to subpyramidal in outline with scattered, irregular, circular to elliptical pores. Three feet run from the distal part of the cephalis, continue on the surface of the thorax and become free after thorax as feet. Feet mainly long, slender, triradiate with wide grooves and thin ridges. From outwardly directed ridges, three wing like extension branch off. Wings mainly thin with scattered, circular to ellipsoidal pore in different size. Wings extend out all along the thorax and feet and roughly wide, triangular in outline.

Included Species:

Alatipicapora gediki n. gen., n. sp.

Alatipicapora sp. A

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Alatipicapora* n. gen. differs from genus *Picapora* KOZUR & MOSTLER by having wing-like extensions on feet.

Alatipicapora gediki n. gen., n. sp.
Plate 32, figures 1-3

Derivation of Name: This species is named for Prof. Dr. Ismet GEDIK, Karadeniz Technical University, Trabzon, Turkey, in honour of his contributions to the knowledge of Conodont biostratigraphy.

Holotype: The specimen on plate 32, figure 1. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 7 specimens.

Description: Same as genus. Test dicyrtid, cephalis small, hemispherical to dome-shaped with rare small circular pores. Apical and vertical horns, strong, long, triradiate with very wide grooves and thin ridges. Thorax larger, pyramidal to subpyramidal in outline with scattered irregular, circular to elliptical pores. Three feet also long, slender, triradiate with wide grooves and thin ridges visible all along the sides of thorax. From outwardly directed ridges, three wings like extension branch off and they are mainly thin with scattered circular to ellipsoidal pores in different size. Wings extend out all along the thorax and feet and roughly wide triangular in outline.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Length of apical horn	60	57	65	60.5
Length of vertical horn	53	50	53	51
Length of cephalis	37	37	40	39
Width of cephalis	47	47	65	54
Length of thorax	107	107	125	115
Max. width of thorax	80	80	110	98
Length of feet	110	100	135	115
Width of wing	43	40	57	46

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Alatipicapora gediki* n. gen., n. sp. differs from *Alatipicapora* sp. A by having larger thorax and more distinctive and wider wings.

Alatipicapora sp. A

Plate 32, figure 4

Brief Definition: Same as genus. Cephalis hemispherical with rare pores and strong vertical and apical triradiate horns. Collar stricture prominent marked by moderately deep depression. Thorax subpyramidal in outline, feet short, triradiate with wide grooves and thin ridges. Wings short subtriangular in outline.

Measurements (μm):

(Based on the 1 specimen)

Length of cephalis	37
Width of cephalis	57
Length of thorax	76.5
Max. width of thorax	73
Max. width of wing	16.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It has been compared to *Alatipicapora gediki* n. gen., n. sp. under latter species.

Genus *Hinedorcus* DUMITRICA, KOZUR & MOSTLER, 1980

Hinedorcus DUMITRICA, KOZUR & MOSTLER
DUMITRICA, KOZUR & MOSTLER, 1980, pp. 23-24

Type species: *Hinedorcus alatus* DUMITRICA, KOZUR & MOSTLER, 1980.

Hinedorcus gibber n. sp.

Plate 32, figures 5-6

Derivation of Name: From the Latin *gibber*= humpback.

Holotype: The specimen on plate 32, figure 5. Sample 96-UKT-531. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: 3 specimens.

Description: With the character of genus. Dicyrtid, cephalis hemispherical, poreless with strong apical horn and short, thorn-like vertical horn. Apical horn stout, triradiate with wide grooves and thin ridges, slightly twisted distally. Collar stricture not distinctive only marked by a shallow depression. Thorax larger, pyramidal with scattered, medium to large circular to subcircular pores. Feet triradiate with wide grooves and thin ridges, short to moderately long and curved inside.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of horn	42	38	42	40
Length of cephalis	38	38	40	39
Width of cephalis	40	40	50	46.5
Length of thorax	42	40	46	42.5
Width of thorax	75	60	75	70
Max. length of feet	58	50	64	57

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /*S. fluegeli* Rad. Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: It differs from *Hinedorcus alatus* DUMITRICA, KOZUR & MOSTLER by having wider and slightly twisted apical horn, larger cephalis and scattered pores on thorax.

Genus ***Picapora*** KOZUR & MOSTLER, 1981

Picapora KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, pp. 109-110

Type Species: *Picapora robusta* KOZUR & MOSTLER,1981.

Picapora elegantissima n. sp.
Plate 32, figures 7, 11

Derivation of Name: For the elegance of its form.

Holotype: The specimen on plate 32, figure 7. Sample 97-UKT-128. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 9 specimens.

Description: Test dicyrtid, cephalis small, subsphaerical with rare circular small pores. Apical horn arcuate, stout, triradiate with deep grooves and thin ridges and at the base (junction to cephalis) bifurcated. Vertical horn situated at the extension of V, similar to apical horn and has approximately same size. In prolongation of 2l, two small spines also present. No visible constrictions between cephalis and thorax. Thorax larger than the cephalis, subsphaerical to subpyramidal in outline. Surface of the thorax not smooth covered by many tubercules and scattered, irregular, circular to elliptical pores. Three feet run from the distal part of the cephalis and continue on the surface of the thorax and become free after thorax as feet. They are mainly long, slender, triradiate with wide grooves and thin ridges and have a tendency to curve inside but distally slightly deviated to outside, pointed.

Measurements (μm):
(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Length of apical horn	70	-	-	70
Length of vertical horn	65	-	-	65
Length of cephalis	30	25	30	27.5
Width of cephalis	55	55	60	57.5
Length of thorax	110	110	120	115
Max. width of thorax	105	100	105	102.5
Length of feet	190	-	-	190

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Picapora elegantissima* n. sp. can be differentiated from *P. robusta* KOZUR & MOSTLER by having a more stout and distinctive apical and vertical horns and longer, slender feet. Additionally the former has wider angle between apical and vertical horns than the latter (110° instead of 70°).

Picapora robusta KOZUR & MOSTLER, 1981
Plate 32, figures 8-9

Picapora robusta KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 110, pl. 7, figs. 1, 2.

Range (this study): Late Triassic, middle Carnian.

Total Range (this study and published): Late Triassic, middle Carnian.

Occurrence: Göstling, Grossreifling, Austria; Haciyunuslar Measured Section, Huglu Unit,

Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Picapora* sp. aff. *P. robusta KOZUR & MOSTLER,1981

Plate 32, figure 10

aff. *Picapora robusta* KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 110, pl. 7, figs. 1, 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Specimen from Yaylakuzdere Measured Section has more compressed and larger thorax while the other properties are similar to *Picapora robusta* KOZUR & MOSTLER. Moreover, poor preservation does not permit detail description.

FAMILY **LIVARELLIDAE** KOZUR & MOSTLER, 1981

Genus ***Livarella*** KOZUR & MOSTLER,1981

Livarella KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 114

Type Species: *Livarella densiporata* KOZUR & MOSTLER, 1981.

Livarella densiporata KOZUR & MOSTLER, 1981

Plate 33, figures 1-2

Livarella densiporata KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, pp. 114-115, pl. 9, fig. 1

YOSHIDA, 1986, pl. 2, figs. 1, 2

CARTER, 1990, pl. 1, fig. 3

YEH, 1992, p. 67, pl. 3, figs. 8, 11; pl. 4, figs. 8, 11, 12, 15

CARTER, 1993, p. 116, pl. 21, figs. 1, 5, 10, 13, 16

NON YEH & CHENG, 1996, p. 13, pl. 6, figs. 7, 10, 11

SUGIYAMA, 1997, p. 183, fig. 50-20

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Zlambacher, Austria; Kagamigahara and Mino Terrane, Central Japan; Uson Island, Philippines; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Livarella magna n. sp.

Plate 33, figures 3-6

Derivation of Name: From the Latin *magna*= Big, large.

Holotype: The specimen on plate 33, figure 3. Sample 96-UKT-476. Deposited at MTA.

Type Locality: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey (See locality description).

Material: 16 specimens.

Description: Cephalis small and node-like, thorax large, subtriangular in outline with irregular, mainly small, circular to subcircular pores. Three symmetrical, equal, long rays situated in one plane have same pore frames as thorax. Rays thick, circular in axial section sometimes widened at the middle part, tapering distally, curved slightly at the tip. In some cases transversal striations visible at the rays.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Width of thorax	100	94	113	102
Length of rays	175	175	190	181
Width of arms (proximally)	40	40	50	44

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: *Livarella magna* n. sp. differs from *L. longus* YOSHIDA by having larger thorax and longer arms with slight curving at distal end. It is distinguished from *L. valida* YOSHIDA by having longer arms.

Livarella valida YOSHIDA, 1986
Plate 33, figure 7

Livarella validus YOSHIDA
YOSHIDA, 1986, p. 14, pl. 3, figs. 1-3
KOJIMA & MIZUTANI, 1987, fig. 3, no. 18.a. b
MIZUTANI & KOJIMA, 1992, pl. 1, figs. 3.a. b
CARTER, 1993, p. 117, pl. 21, figs. 2, 3, 4, 6, 7, 14
SUGIYAMA, 1997, p. 183, fig. 50-18 **NON** 19

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Kagamigahara and Mino Terrane, Central Japan; Oman; Nadanhada Range, Northeast China; Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

FAMILY **NAKASEKOELLIDAE** KOZUR, 1984a

Genus ***Nakasekoellus*** KOZUR, 1984a

Nakasekoellus KOZUR
KOZUR, 1984a, p. 60
Xipha BLOME
BLOME, 1984, p. 59

Type Species: *Stichophormis polita* HINDE, 1908.

Nakasekoellus inkensis KOZUR, 1994
Plate 33, figures 8-9

Nakasekoellus inkensis KOZUR
KOZUR in KOZUR & MOSTLER, 1994, p. 250, pl. 1.A, fig. 4

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Balaton Highland, Hungary; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Nakasekoellus pessagnoi (NAKASEKO & NISHIMURA, 1979) emend. BLOME, 1984 n. comb.
Plate 33, figure 10

Dictyomitra pessagnoi NAKASEKO& NISHIMURA
NAKASEKO & NISHIMURA, 1979, p. 77, pl. 9, figs. 2-4
Eucyrtidium (?) *pessagnoi* (NAKASEKO & NISHIMURA, 1979)
YAO, 1982, pl. 2, fig. 8
YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 16
Nakasekoellus polita (HINDE)
KOZUR, 1984a, p. 60
Xipha pessagnoi (NAKASEKO & NISHIMURA, 1979)
BLOME, 1984, pp. 59-60, pl. 16, figs. 6, 9, 17
YEH, 1989, p. 77, pl. 8, figs. 7, 8, 13
Eucyrtidiellium pessagnoi (NAKASEKO & NISHIMURA, 1979)
BRAGIN, 1991a, pl. 6, fig. 6
Xipha sp. cf. *X. pessagnoi* (NAKASEKO & NISHIMURA, 1979)
BLOME & REED, 1995, p. 63, pl. 2, figs. ? 5, ? 6, ? 11, ? 12

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: Southwest and Central Japan; East-Central Oregon, North-Central Nevada, Alaska, USA; Sikhoto-Alyn, Fareast Russia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Nakasekoellus* KOZUR (1984a, Jenuary) is the senior synonym of *Xipha* BLOME (1984, April).

FAMILY **NEOSCIDOCAPSIDAE** PESSAGNO, 1969

Genus ***Squinabolella*** PESSAGNO, 1969

Squinabolella PESSAGNO
PESSAGNO, 1969, p. 418
NON KOZUR & MOSTLER, 1979, p. 94

Type Species: *Squinabolella putahensis* PESSAGNO, 1969.

Squinabolella* sp. aff. *S. causia CARTER, 1993

Plate 33, figure 11

aff. *Squinabolella* ? sp. 1
CARTER, 1990, pl. 2, fig. 7
aff. *Squinabolella causia* CARTER
CARTER, 1993, p. 100, pl. 16, figs. 5, 8, 12, 14
Squinabolella sp. aff. S. *causia* CARTER
CARTER, 1993, p. 101, pl. 17, figs. 10, 14

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This form differs from *S. causia* CARTER in having narrower thoracic skirt and at one specimen additionally well-developed thoracic velum.

Squinabolella* ? *trispinosa CARTER, 1993

Plate 33, figures 12-13

Squinabolella ? *trispinosa* CARTER
CARTER, 1993, p. 102, pl. 17, figs. 3, 4
SUGIYAMA, 1997, p.187, fig. 50-12
? *Squinabolella* (?) sp. cf. *S.* (?) *trispinosa* CARTER
YEH & CHENG, 1996, p. 14, pl. 5, figs. 1, 2, 6, 15, 16

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; ?Busuanga Island, Philippines; Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

SUBFAMILY **CITRIDUMINAE** KOZUR, 1984

Genus ***Citriduma*** DE WEVER, 1982a

Citriduma DE WEVER
DE WEVER, 1982a, p. 202

Type species: *Citriduma radiotuba* DE WEVER, 1982a.

Citriduma asteroides CARTER, 1993

Plate 34, figures 1-2

Gen. Nov. E sp. 1
CARTER, 1990, pl. 2, fig. 8
Citriduma asteroides CARTER
CARTER, 1993, p. 97, pl. 15, figs. 3, 5, 8, 9
NON SUGIYAMA, 1997, p. 176, fig. 50-8
(=*Citriduma* sp. A CARTER, 1993)
Citriduma sp. aff. *C. asteroides* CARTER
YEH & CHENG, 1996, p. 16, pl. 6, figs. 13-14

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Busuanga Islands, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus ***Praecitriduma*** KOZUR, 1984a

Praecitriduma KOZUR
KOZUR, 1984a, p. 66

Type Species: *Praecitriduma mostleri* KOZUR, 1984a.

Praecitriduma canthofistula CARTER, 1993

Plate 34, figure 3

Praecitriduma sp. 1
CARTER, 1990, p. 67, pl. 1, fig. 7
Praecitriduma canthofistula CARTER
CARTER, 1993, p. 99, pl. 16, figs. 1, 2, 15

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Island, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Turkey.

FAMILY **PLANISPINOCYRTIIDAE** KOZUR & MOSTLER, 1981

Genus ***Spinotriassocampe*** KOZUR, 1984a

Spinotriassocampe KOZUR

KOZUR, 1984a, p. 74

Bikinella TIKHOMIROVA

TIKHOMIROVA, 1986, p. 29

Type Species: *Spinotriassocampe hungarica* KOZUR, 1984a

Spinotriassocampe carnica KOZUR & MOSTLER, 1994

Plate 34, figure 4

Spinotriassocampe carnica KOZUR & MOSTLER

KOZUR & MOSTLER, 1994, p. 105, pl.26, fig. 7

Spinotriassocampe carnica KOZUR & MOSTLER Group

NON SUGIYAMA, 1997, p. 187, fig. 49-3 (?= *S. longobardica* KOZUR & MOSTLER, 1994)

Range (this study): Late Triassic; middle Carnian.

Total Range (this study and published): Late Triassic; middle Carnian.

Occurrence: Sosio Valley, Sicily, Italy; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Spinotriassocampe longobardica KOZUR & MOSTLER, 1994

Plate 34, figures 5-6

Triassocampe ? sp. F

YAO, 1982, pl. 1, fig. 10

YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 9

Spinotriassocampe longobardica KOZUR & MOSTLER

KOZUR & MOSTLER, 1994, p. 106, pl. 26, figs. 8, 11, 12, 14; pl. 27, figs. 4, 6, 8

KELLICI & DE WEVER, 1995, p. 160, pl. 6, fig. 12

? *Spinotriassocampe carnica* KOZUR & MOSTLER Group

SUGIYAMA, 1997, p. 187, fig. 49-3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Inuyama Area, Central Japan; Köveskal, Balaton Highland, Hungary; Marmolada Massif, Northen Italy; ?Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **PSEUDODICTYOMITRIDAE** PESSAGNO, 1977

Genus ***Corum*** BLOME, 1984

Corum BLOME

BLOME, 1984, pp. 50-51

Type species: *Corum speciosum* BLOME, 1984.

Corum candidum YEH, 1989

Plate 35, figure 6

Corum candidum YEH

YEH, 1989, p. 69, pl. 9, figs. 7, 8, 20, 21

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: East-central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Corum ? delgado SUGIYAMA, 1997
Plate 35, figures 1-2

Triassocampe ? sp. E
YAO, 1982, pl. 2, fig. 11 **NON** fig. 12
Corum ? delgado SUGIYAMA
SUGIYAMA, 1997, p. 151, figs. 41- 1, 2

Range (this study): Late Triassic; early Carnian.

Total Range (this study and published): Late Triassic; early Carnian- middle Carnian.

Occurrence: Inuyama area and Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Corum fusiformis n. sp.
Plate 35, figures 3-5

Derivation of Name: Due to its fusi shape.

Holotype: The specimen on plate 35, figure 3. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 8 specimens.

Description: Test multicyritid, spindle-shaped with mainly five to six post-abdominal segments. Test mainly increasing in width until third post-abdominal segment then decreasing in width. Cephalis dome-shaped without horn. Collar stricture indistinct and mainly covered by microgranular silica. Thorax subtrapezoidal, both cephalis and thorax imperforate, mainly without costae. Lumbar and subsequent strictures prominent with one big circular row of pores. Abdomen to third post-abdominal segments subtrapezoidal rest of the post-abdominal segments inverse subtrapezoidal in outline. Abdomen and post-abdominal segments strongly costate with 22-24 (11-12 at one side) coarse and discontinuous costae. Last post-abdominal segment imperforate, lacking costae.

Measurements (μm):
(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	13.5	12.5	16	14
Width of cephalis	23	23	27	25
Length of thorax	13.5	13.5	20	16
Width of thorax	40	35	53	42.5
Length of abdomen	20	17.5	20	19
Width of abdomen	53	53	56	54.5
Max. width of the test	100	95	115	103
Total length of test	220	200	245	221

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.- *E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Corum fusiformis* n. sp. differs from *C. regium* BLOME by having larger, spindle-shape instead of conical outline.

Corum kraineri n. sp.
Plate 35, figures 7-9

Derivation of Name: This species is named for Prof. Dr. Karl KRAINER, Geology Department, Innsbruck University, Innsbruck, Austria, in honour of his contributions to the knowledge of carbonate geology and sedimentology.

Holotype: The specimen on plate 35, figure 7. Sample 96-UKT-580. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: More than 100 specimens.

Description: Test as for genus, subconical consisting of six to seven post-abdominal chambers. Cephalis hemispherical to dome-shape, smooth and poreless. Thorax to last post-abdominal segments increasing in width slowly and trapezoidal to subtrapezoidal in outline, occasionally last segment slightly decreasing in width. Thorax and abdomen same like cephalis, poreless and covered by veneer of microgranular silica. Collar and lumbar strictures both indistinct but subsequent strictures more prominent but not very deep. Some relicts of row of circular pores present in these strictures but mainly covered by microgranular silica.

Irregular thin, discontinuous irregular costae visible all post-abdominal segments also very weak at abdominal segments and 11-12 costae countable at one side of test (total 22-24 at whole test, laterally). Rare scattered pores situated in between the costae but mainly covered by microgranular silica.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	19	24	21
Width of cephalis	36	27	36	32
Length of thorax	24	20	24	21
Width of thorax	56	40	56	47
Length of abdomen	30	24	30	28
Width of abdomen	64	52	64	60
Total length of test	292	224	300	270
Max. width of the test	124	98	125	116

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Corum kraineri* n. sp. differs from *C.* ? *delgado* SUGIYAMA by having thin costae, absence of costae on apical part. It will be compared to *Corum sugozuensis* n. sp. under latter species.

Corum regium BLOME, 1984

Plate 35, figures 10-11

Corum regium BLOME

BLOME, 1984, p. 51, pl. 13, figs. 3, 8, 15

YOSHIDA, 1986, pl. 5, fig. 4

? SUGIYAMA, 1997, p. 176, fig. 49-4

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Gifu Prefecture and ?Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Corum speciosum BLOME, 1984

Plate 35, figure 12

Corum speciosum BLOME

BLOME, 1984, pp. 51-52, pl. 13, figs. 4, 13, 14, 17

BLOME & REED, 1995, p. 61, pl. 2, fig. 14

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon and Neveda, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Corum sugozuensis n. sp.

Plate 35, figures 13-14

Derivation of Name: According to its type locality situated very close to Sugozu Village.

Holotype: The specimen on plate 35, figure 13. Sample 96-UKT-547. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey (See locality description).

Material: More than 100 specimens.

Description: Test as for genus subconical to spindle-shaped consisting of six to seven post-abdominal chambers. Cephalis hemisphaerical to dome-shaped, smooth and poreless. Thorax to fifth post-abdominal segments increasing in width slowly and trapezoidal to subtrapezoidal in outline, last two post-abdominal segments decreasing in width slowly again and inverse subtrapezoidal in outline. Thorax and abdomen same like cephalis, poreless and covered by veneer of microgranular silica. Collar stricture and stricture between thorax and abdomen indistinct but subsequent strictures deep and prominent. One row of circular pores present in these strictures. Irregular thick, discontinuous costae visible at all post-abdominal segments rarely at abdominal segments and 9-10 costae countable at one side of test (total 18-20 at

whole test, laterally). Scattered pores situated in between the costae mainly close the strictures.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	13	13	13	13
Width of cephalis	26	20	26	22
Length of thorax	17	17	18	17.5
Width of thorax	33	32	33	32.5
Length of abdomen	17	17	20	18
Width of abdomen	50	44	50	48
Total length of test	217	217	233	225
Max. width of the test	97	97	100	99

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z./ *S. rarauana* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Corum sugozuensis* n. sp. differs from *C.* ? *delgado* SUGIYAMA by having more inflated test instead of slender one and absence of costae at apical part. It could be distinguished from *C. kraineri* n. sp. by having more distinct pores at the strictures between post-abdominal segments, thicker costae, slightly spindle-shaped test instead of subconical.

Genus ***Kozuricyrtium*** n. gen.

Type species: *Kozuricyrtium carinatus* n. gen., n. sp.

Derivation of Name: This genus is dedicated to Dr. Heinz W. KOZUR, Budapest, Hungary, honoring his contributions to the knowledge of Radiolaria, Conodont and Ostracoda Biostratigraphy.

Description: Test multicyritid, roughly spindle-shaped with five to seven post-abdominal segments increasing in width until third to fourth post-abdominal segment then decreasing in width. Cephalis dome-shaped, smooth without horn. Both thorax and abdomen subtrapezoidal in outline mainly smooth, imperforate like cephalis covered by microgranular silica. Occasionally weak costae present on the surface of abdomen. Both collar and lumbar strictures not distinctive mainly covered by microgranular silica. First to third or fourth post-abdominal segments subtrapezoidal, subsequent segments inverse subtrapezoidal in outline with strong discontinuous costae. Strictures between abdominal and first post-abdominal segments and subsequent strictures distinctive always marked by deep depressions and with many circular to elliptical, irregularly oriented pores. Distally, size of pore increasing and relict pores also present between costae. Last segment (velum) always vestigial in different shape without costae and with many pores.

Included Species:

Kozuricyrtium carinatus n. gen., n. sp.

Kozuricyrtium pulchra n. gen., n. sp.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus differs from genus *Corum* BLOME and genus *Pseudodictyomitra* PESSAGNO by having irregular, different amount pores at strictures instead of one or two rows of pores and vestigial segment at the distal end.

Kozuricyrtium carinatus n. gen., n. sp.

Plate 36, figures 1-5

Derivation of Name: Due to its distinctive costae.

Holotype: The specimen on plate 36, figure 1. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Same as for genus. Test roughly spindle-shaped with five post-abdominal segments increasing in width until third post-abdominal segment then decreasing in width. Cephalis dome-shaped without horn. Both thorax and abdomen subtrapezoidal in outline mainly smooth and imperforate like cephalis covered by microgranular silica. Occasionally weak costae present on the surface of abdomen. Both collar and lumbar strictures not distinctive

mainly covered by microgranular silica. First to third post-abdominal segments subtrapezoidal, subsequent segments inverse subtrapezoidal in outline with strong discontinuous 18 costae (9 of them visible laterally at one side of test, laterally). Strictures between abdominal and first post-abdominal segments and subsequent strictures distinctive always marked by deep depressions and with many circular to elliptical irregularly oriented pores. Distally, size of pores increasing and relict pores also present between costae. Last segment (velum) always vestigial in different shape, sometimes slightly widening distally and brimmed without costae and with many pores.

Measurements (μm):

(Based on the 7 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	27	25	30	26.5
Width of cephalis	40	35	45	40
Length of thorax	30	25	40	31.5
Width of thorax	57	57	70	62.5
Length of abdomen	33	30	35	32
Width of abdomen	67	67	90	81
Total length of test	316	250	325	289
Max. width of form (medially)	123	110	140	117

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Kozuricyrtium carinatus* n. gen., n. sp. differs from *K. pulchra* n. gen., n. sp. by having five post-abdominal segments instead of seven and smaller test.

Kozuricyrtium pulchra n. gen., n. sp.
Plate 36, figures 6-8

Derivation of Name: From the Latin *pulchra*= Beautiful.

Holotype: The specimen on plate 36, figure 6. Sample 97-UKT-128. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Same as for genus. Test spindle-shaped with seven post-abdominal segments increasing in width until fourth post-abdominal segment then decreasing in width. Cephalis dome-shaped without horn. Both thorax and abdomen subtrapezoidal in outline mainly smooth and imperforate like cephalis covered by microgranular silica. Occasionally weak costae present on the surface of abdomen. Both collar and lumbar strictures not distinctive mainly covered by microgranular silica. First to fourth post-abdominal segments subtrapezoidal, subsequent segments inverse subtrapezoidal in outline with strong discontinuous 18-20 costae (9-10 of them visible laterally at one side of test). Strictures between abdominal and first post-abdominal segments and subsequent strictures distinctive always marked by deep depressions and with many circular to elliptical irregularly oriented pores. Size of pores increasing distally. Many relict pores also present between costae generally at last three post-abdominal segments. Last segment (velum) always vestigial, slightly decreasing in width distally without costae and with many circular pores.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	20	25	23
Width of cephalis	40	32	40	37
Length of thorax	30	20	30	27
Width of thorax	60	45	60	53
Length of abdomen	30	20	30	26
Width of abdomen	75	60	75	68
Total length of test	350	324	350	334
Max. width of test	140	125	140	134.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Kozuricyrtium pulchra* n. gen., n. sp. has been compared to *K. carinatus* n. gen., n. sp. under latter species.

FAMILY **PSEUDOSATURNIFORMIDAE** KOZUR & MOSTLER, 1979

Genus ***Pseudosaturniforma*** KOZUR & MOSTLER, 1979

Pseudosaturniforma KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 91

Type species: *Pseudosaturniforma latimarginata* KOZUR & MOSTLER,1979.

Pseudosaturniforma carnica KOZUR & MOSTLER,1979
Plate 34, figures 7-10

Pseudosaturniforma carnica KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 92, pl. 17, fig. 3
KOZUR & MOSTLER, 1981, p. 93, pl. 22, fig. 3; pl. 25, fig. 1
BLOME, 1984, p. 52, pl. 13, figs. 5, 9, 11, 18

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: Gostling and Grossreifling, Austria; East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

FAMILY **RUESTICYRTIIDAE** KOZUR & MOSTLER, 1979

Genus ***Pararuesticyrtium*** KOZUR & MOCK, 1981

Pararuesticyrtium KOZUR & MOCK
KOZUR & MOCK in KOZUR & MOSTLER, 1981, pp. 93-94

Type Species: *Pararuesticyrtium densiporatum* KOZUR & MOCK, 1981.

Pararuesticyrtium ? anatoliaensis n. sp.
Plate 36, figures 9-12

Derivation of Name: Due to its occurrence in Anatolia.

Holotype: The specimen on plate 36, figure 9. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 12 specimens.

Description: Test long, conical with eleven post-abdominal segments. Both the width and length of segments increasing slowly until 8-9 post-abdominal segments then slightly decreasing at last 2-3 post-abdominal segments. Cephalis dome-shaped, smooth and poreless. Small vertical horns may be present in the prolongation of V and D. Collar stricture indistinct covered by microgranular silica. Thorax hoop-like, again poreless and smooth. Lumbar stricture and subsequent strictures distinctive always marked by gentle depressions with one row of circular pores (12-16 pores at the one side of the test, laterally). Abdomen and post-abdominal segments broad, hoop-like with small nodes and irregularly arranged small pores.

Measurements (μm):

(Based on the 3 specimens, only 2 of them are complete)

	HT	Min.	Max.	Av.
Length of cephalis	16	14	17	16
Width of cephalis	24	20	24	22
Length of thorax	20	17	20	18
Width of thorax	36	32	40	36
Length of abdomen	22	19	22	20
Width of abdomen	40	40	43	42
Total length of test	308	308	334	321
Max. width of test	84	78	87	83

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Pararuesticyrtium* ? *anatoliensis* n. sp. is tentatively assigned to genus *Pararuesticyrtium* KOZUR & MOCK due to occurrence of row of pores at strictures and absence of apical and vertical horns. However, general shape of the test, pore frames of the

segments and outer shape of the segments (broad) display a close similarity to this genus. It differs from *Ruesticyrtium longum* KOZUR & MOSTLER by having broad, hoop-like segment outline instead of more sharp triangular ones and pores at strictures.

Pararuesticyrtium mediobulbosum n. sp.

Plate 36, figures 13-14

Unnamed Nassellaria

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, **ONLY** pl. 5, fig. 3

Derivation of Name: Because of its bulbous medial part.

Holotype: The specimen on plate 36, figure 13. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 13 specimens.

Description: Test roughly spindle-shaped with eight post-abdominal segments and highly inflated medial part. Both width and length of segments increasing rapidly until third post-abdominal segment then decreasing distally. Cephalis broad, dome-shaped, smooth, poreless probably with small apical horn and vertical horn. Thorax hoop-like, again poreless, smooth and bigger than cephalis. All strictures on test prominent always marked by gentle, deep depressions without pores. Rest of the segments broad, hoop-like with many circular pores in different size. Pore frames on the segments first visible at abdominal segment, before that covered by microgranular silica.

Measurements (μm):

(Based on the 3 specimens, only one of them is complete)

	HT	Min.	Max.	Av.
Length of cephalis	10	10	10	10
Width of cephalis	27	20	27	23.5
Length of thorax	17	17	17	17
Width of thorax	40	33	40	36.5
Length of abdomen	23	23	33	28.5
Width of abdomen	53	43	60	52
Total length of test	317	-	-	317
Max. width of test	130	127	130	128.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Baja California Sur, Mexico; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Pararuesticyrtium mediobulbosum* n. sp. differs from all of the other species of the genus *Pararuesticyrtium* KOZUR & MOCK by having inflated medial part.

***Pararuestiyrtium* sp. A**

Plate 36, figure 15

Brief Definition: Test roughly conical, cephalis big, smooth with moderately long apical horn and short lateral horn. Apical horn triradiate with thin ridges and moderately wide grooves, distally tapering and pointed. Thorax and abdomen wider, hoop-like with a net like hexagonal pore frames and approximately uniform medium size pores. Both collar and lumbar stricture, poreless and marked by deep depressions.

Measurements (μm):

(Based on the 1 specimen)

Length of cephalis	40
Width of cephalis	53
Length of thorax	53
Width of thorax	87
Length of abdomen	63
Width of abdomen	87
Total length of test (including apical horn)	207

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Pararuesticyrtium* sp. A differs from *P. mediobulbosum* n. sp. by having very distinctive cephalis with triradiate apical horn.

FAMILY **SANFLIPPOELLIDAE** KOZUR & MOSTLER, 1979

Genus ***Annulopoulpus*** KOZUR & MOSTLER, 1981

Annulopoulpus KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 83

Type Species: *Annulopoulpus costatus* KOZUR & MOSTLER, 1981.

Annulopoulpus antalyaensis n. sp.
Plate 37, figures 1-3, 5

Derivation of Name: Because of its occurrence near by Antalya city, Turkey.

Holotype: The specimen on plate 37, figure 1. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 32 specimens.

Description: Test as for genus. Monocyritid, cephalis wide and spherical. Cephalis has outer big polygonal pore frames with nodes at pore frame vertices. Inner pore frames, more small, polygonal (mainly triangular) with circular to elliptical pores in different size. Feet moderately long, triradiate with wide ridges and deep grooves. They loosely twisted mainly curved inside then slightly deviated distally. Mouth opening wide and circular surrounded by two rings separating by shallow groove.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	100	100	135	116
Width of cephalis	240	225	250	239
Diam. of mouth opening	115	90	115	106
Length of feet	150	130	150	136

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Annulopoulpus antalyaensis* n. sp. differs from *A. reticulatus* KOZUR & MOSTLER by having wider cephalis and larger mouth opening.

Annulopoulpus reticulatus KOZUR & MOSTLER, 1981
Plate 37, figure 4

Annulopoulpus reticulatus KOZUR & MOSTLER
KOZUR & MOSTLER, 1981, p. 84, pl. 31, fig. 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Hozmadia*** DUMITRICA, KOZUR & MOSTLER, 1980

Hozmadia DUMITRICA, KOZUR & MOSTLER
DUMITRICA, KOZUR & MOSTLER, 1980, p. 21

Type Species: *Hozmadia reticulata* DUMITRICA, KOZUR & MOSTLER, 1980.

Hozmadia spinosa KOZUR & MOSTLER, 1994
Plate 37, figure 6

Hozmadia spinosa KOZUR & MOSTLER, 1994
KOZUR & MOSTLER, 1994, pp. 115-116, pl. 30, figs. 4, 7

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; late Anisian- late Ladinian (*M. cochleata* Rad. Z./ *S. fluegeli* Rad. Subz.).

Occurrence: Balaton Highland, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus *Neopyletonema* KOZUR, 1984a

Neopyletonema KOZUR
KOZUR, 1984a, pp. 70-71

Type species: *Neopyletonema mesotriassica* KOZUR, 1984a.

Neopyletonema procera SUGIYAMA, 1997
Plate 37, figures 7-9

Poulpus (?) sp. C
YEH, 1989, p. 74, pl. 6, figs. 5, 10
Neopyletonema procera SUGIYAMA
SUGIYAMA, 1997, pp. 161-162, figs. 46-3a, b

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: East-Central Oregon, USA; Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Parapoulpus*** KOZUR & MOSTLER, 1979

Parapoulpus KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, p. 88

Type species: *Parapoulpus oertlii* KOZUR & MOSTLER, 1979.

Parapoulpus oertlii KOZUR & MOSTLER, 1979
Plate 37, figures 10-11

Parapoulpus oertlii KOZUR & MOSTLER
KOZUR & MOSTLER, 1979, pp. 88-89, pl. 7, fig. 5
KOZUR & MOSTLER, 1981, p. 81, pl. 26, fig. 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

***Parapoulpus* sp. A**
Plate 37, figure 12

Brief Definition: Test as for genus. Monocyritid, thick walled spongy skeletons. Cephalis hemispheric and three long feet followed it. Feet long, circular in axial section, first curved to inside and then have a tendency turn to outside. Velum after cephalis long, subcylindrical slightly widening distally, mouth opening wide and distal side of the mouth opening does not show special feature.

Measurements (μm):
(Based on the 1 specimen)

Length of cephalis	67
Width of cephalis	137
Length of feet	267
Length of velum	153
Width of the distal end of the velum	167

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Parapoulpus* sp. A differs from *P. oertlii* KOZUR & MOSTLER by possessing circular feet instead of triradiate ones.

Genus ***Poulpus*** DE WEVER, 1979

Poulpus DE WEVER
DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 59

Type species: *Poulpus piabyx* DE WEVER, 1979.

Poulpus curvispinus DUMITRICA, KOZUR & MOSTLER,1980

Poulpus curvispinus cuvispinus DUMITRICA, KOZUR & MOSTLER,1980

Plate 38, figures 1-2

Poulpus curvispinus DUMITRICA, KOZUR & MOSTLER

DUMITRICA, KOZUR & MOSTLER, 1980, p. 22, pl. 2, fig. 1; pl. 15, figs. 5, 6

GORICAN & BUSER, 1990, p. 153, pl. 9, figs. 1, ?2

Poulpus aff. *curvispinus* DUMITRICA, KOZUR & MOSTLER

YAO, 1982, pl. 1, fig. 18

?GORICAN & BUSER, 1990, p. 153, pl. 9, fig. 3

Poulpus curvispinus cuvispinus DUMITRICA, KOZUR & MOSTLER

KOZUR & MOSTLER, 1994, p. 116, pl. 32, figs. 5, 8

Poulpus sp. cf. *P. curvispinus* DUMITRICA, KOZUR & MOSTLER

SUGIYAMA, 1997, p. 184, fig. 49-9

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata/ S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Occurrence: Southern Alps; Inuyama Area and Mino Terrane, Central Japan; Slovenia; Koveskal, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Poulpus piabyx DE WEVER, 1979

Plate 38, figures 3-4

Poulpus piabyx DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER,1979, pp. 61-62, pl. 7, figs. 12, 13.

DE WEVER, 1982b, pp. 328-329, pl. 48, figs. 5-6

KOZUR & MOSTLER, 1979, p. 87, pl. 4, fig. 3

KOZUR & MOSTLER, 1981, p. 80, pl. 30, fig. 5

DE WEVER, 1984b, pl. 3, figs. 3, 4

YEH, 1990, p. 27, pl. 8, figs. 3, 7, 9

SUGIYAMA, 1997, p. 185, fig. 49-15

Range (this study): Late Triassic; middle Carnian- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; early Carnian- early Norian (*E. triangularis* Con. Z.).

Occurrence: Karpenission, Greece; Göstling, Austria; Westkarpats; Hungary; Busuanga Island, Philippines; Mino Terrane, Central Japan; Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Poulpus transitus KOZUR & MOSTLER, 1981

Plate 38, figure 5

Poulpus transitus KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 81, pl. 29, fig. 2; pl. 31, fig. 3

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; middle Carnian- early Norian (*E. abneptis* Con. Z.).

Occurrence: Gostling and Grossreifling, Austria; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Sanflippoella*** KOZUR & MOSTLER, 1979

Sanflippoella KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, p. 93

Type Species: *Sanflippoella tortilis* KOZUR & MOSTLER, 1979.

Sanflippoella lengeranlii n. sp.

Plate 38, figures 6-8

Derivation of Name: This species is named for M. Sc. Yunus LENGERANLI, General Directorate of Mineral Research and Exploration (MTA), Ankara, Turkey, in honour of his contributions to the study of Turkish geology.

Holotype: The specimen on plate 38, figure 6. Sample 98-UKT-59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 13 specimens.

Description: Cephalis large, imperforate, hemiglobular with robust horn. Horn wide at the base tapering and twisted distally, triradiate with wide grooves and thin ridges. Small vertical spine presents at the projections of V. Thorax much broader, subpyramoidal in with many circular pores. Three downward directed, proximally outwardly, distally inwardly curved triradiate, moderately long feet with wide grooves and thin ridges in prolongation of D and 2l present. Velum at the end of thorax in different size, long and cylindrical at well preserved individuals.

Measurements (µm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of apical horn	67	53	67	59
Length of cephalis	37	33	37	35.5
Width of cephalis, distally	57	50	57	52
Length of thorax	50	50	53	51
Width of thorax	87	83	93	87
Length of velum	73	-	-	73
Length of feet	150	137	173	152

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Sanflippoella lengeranlii* n. sp. differs from *S. tortilis* KOZUR & MOSTLER in having loosely twisted apical horn with wide grooves, smaller pores at thorax instead of large elevated pore frames, more straight feet.

Genus ***Spinopoulpus*** KOZUR & MOCK, 1981

Spinopoulpus KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 85

Type Species: *Spinopoulpus noricus* KOZUR & MOCK, 1981

Spinopoulpus noricus KOZUR & MOCK, 1981

Plate 38, figure 9

Spinopoulpus noricus KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 86, pl. 30, fig. 4

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Western Karpats; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Veghia*** KOZUR & MOSTLER, 1981

Veghia KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 86

Type Species: *Veghia goestlingensis* KOZUR & MOSTLER, 1981.

Veghia sulovensis KOZUR & MOCK, 1981

Plate 38, figure 11

Veghia sulovensis KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 87, pl. 31, fig. 1

Poulpus sp.

YOSHIDA, 1986, pl. 7, fig. 10

Veghia sp.

YEH, 1989, p. 76, pl. 6, fig. 4

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Westkarpats; East-Central Oregon, USA; Gifu Prefecture, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Veghia* sp. aff. *V. sulovensis KOZUR & MOCK, 1981

Plate 38, figure 10

aff. *Veghia sulovensis* KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 87, pl. 31, fig. 1

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Although opposite meaning suggested at original genus description, feet of the form touch each other and create a kind of ring structure. Whether this kind of property could be recognise as a generic features or not, could only be answered and discussed with abundant material.

FAMILY **SILICARMIGERIDAE** KOZUR & MOSTLER, 1980

Genus ***Silicarmiger*** DUMITRICA, KOZUR & MOSTLER, 1980

Silicarmiger DUMITRICA, KOZUR & MOSTLER

DUMITRICA, KOZUR & MOSTLER, 1980, p. 23

Type Species: *Silicarmiger costatus* DUMITRICA, KOZUR & MOSTLER, 1980.

Silicarmiger curvatus (KOZUR & MOSTLER, 1979)

Plate 38, figures 12-13

Eonapora curvata KOZUR & MOSTLER

KOZUR & MOSTLER, 1979, pp. 90-91, pl. 13, fig. 5

Silicarmiger curvatus (KOZUR & MOSTLER, 1979)

KOZUR, 1984a, p. 63, pl. 4, fig. 3

KOZUR & MOSTLER, 1994, p. 119, pl. 33, figs. 11, 12, 14

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian- late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Grossreifling, Austria; Koveskal, Hungary; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Silicarmiger latus KOZUR & MOSTLER, 1994

Silicarmiger latus latus KOZUR & MOSTLER,1994

Plate 38, figures 14-15

Stichopterium (?) sp. A

NAKASEKO & NISHIMURA, 1979, p. 80, pl. 11, figs. 1(?), 3(?), 4

Silicarmiger aff. *costatus* DUMITRICA, KOZUR & MOSTLER

GORICAN & BUSER, 1990, p. 156, pl. 10, fig. 9

Silicarmiger latus latus KOZUR & MOSTLER

KOZUR & MOSTLER, 1994, p. 119, pl. 34, figs. 3, 4, 9; pl. 35, figs. 2, 5

Silicarmiger latus KOZUR & MOSTLER

SUGIYAMA, 1997, p. 187, fig. 49-27

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. fluegeli* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian-late Ladinian (*M. cochleata* Rad. Z. /*S. fluegeli* Rad. Subz.).

Occurrence: Southwest and Central Japan; Vrisic and Mokrokong, Slovenia; Koveskal, Balaton Highland, Hungary; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **SYRINGOCAPSIDAE** FOREMAN, 1973 emend. PESSAGNO 1977

Genus ***Podobursa*** WISNIOWSKI, 1889 emend. FOREMAN, 1973

Podobursa WISNIOWSKI

WISNIOWSKI, 1889, p. 686

emend. FOREMAN, 1973, p. 266

Type Species: *Podobursa dunikowskii* WISNIOWSKI, 1889.

Podobursa akayi n. sp.

Plate 39, figures 1-3

Derivation of Name: This species is named for M. Sc. Ergun AKAY, General Directorate of Mineral Research and Exploration (MTA), Ankara, Turkey, in honour of his contributions to the study of Turkish geology.

Holotype: The specimen on plate 39, figure 1. Sample 98-UKT-59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Test of four segments. Cephalis hemispherical to dome-shaped, smooth, poreless without horn or with very rudimentary horn. Thorax and abdomen small, like cephalis subtrapezoidal in outline covered by microgranular silica, smooth and poreless. Collar and lumbar strictures indistinct marked by only shallow depressions. Stricture between abdominal and post-abdominal segments more prominent with one row of pores. Pores small to medium sized, circular to semicircular and 7-8 countable at one side of test, laterally. Post-abdominal segment bulbous with big polygonal (mainly hexagonal) pore frames with small nodes at pore frame vertices and circular to semicircular pores. One row of thin needle-like spine located at the medial part of the post-abdominal segment, 5 of them visible laterally at the one side of the test. Boundary between post-abdominal segment and tube well marked by change in outline. Tube cylindrical, long with pore frames same as post-abdominal segment, more or less constant in width and with triangular projections at the distal end.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max	Av.
Length of cephalis	16	15	20	16.5
Width of cephalis	25	30	33	30
Length of thorax	16	15	20	17
Width of thorax	40	40	46	43
Length of abdomen	16	15	20	17
Width of abdomen	60	50	73	61
Length of post-abdominal segment	110	110	190	147
Width of post-abdominal segment	156	156	240	192
Length of tube	200	200	200	200
Max. width of tube	50	50	75	60
Total length of the form	360	360	430	395

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa akayi* n. sp. differs from *P. primitiva* n. sp. by having spines on the medial part of the post-abdominal segment. It can be distinguished from both *P. galeata* n. sp., *P. turriformis* n. sp., *P. yazgani* n. sp. and *P.* sp. A by the absence of apical horn, shorter and less distinctive apical part.

Podobursa galeata n. sp.

Plate 39, figures 4-5

Derivation of Name: From the Latin *galeata*= helmet.

Holotype: The specimen on plate 39, figure 4. Sample 98-UKT-62. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (see locality description)

Material: 9 specimens.

Description: Test roughly spindle-shaped with four segments. Cephalis small, hemispherical to dome-shaped with small horn. Thorax subtrapezoidal, broader than cephalis and

poreless as cephalis. Abdomen prominent, disc-shaped with small pores. Collar stricture indistinct, lumbar stricture more prominent with one row of small circular pores (11-12 visible at one side of the test). Stricture between abdomen and post-abdominal segments marked by a deep depression and abrupt changing in outline and with one row of circular, medium sized pores (10-12 visible at one side of the test). Post-abdominal segment spindle-shaped with sharp triangular central part with many, thin, short to moderately long and needle-like spines, 5-7 visible at one side of the test. Surface of the post-abdominal segment covered by large, polygonal (mainly hexagonal) pore frames with large circular to semicircular pores. Tube long with same pore frames as post-abdominal segment, slightly tapering distally and without any projections at the distal end.

Measurements (µm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	20	26	23.5
Width of cephalis	40	40	60	46.5
Length of thorax	33	30	40	34
Width of thorax	60	60	75	67
Length of abdomen	60	50	60	54
Width of abdomen	93	90	113	98.5
Length of post-abdominal segment	100	100	115	107
Width of post-abdominal segment	186	165	210	187
Length of tube	153	120	165	146
Max. width of tube	53	40	72	55
Total length of the Form (incl. horn)	407	320	407	373.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa galeata* n. sp. has been compared to *P. akayi* n. sp. under latter species. It can be distinguished from *P. primitiva* n. sp. by having more distinctive apical part and apical horn. It differs from *P. turriformis* n. sp. and *P. yazgani* n. sp. by having spindle-shaped post-abdominal segment. It can be also differentiated from *P.* sp. A by having more globular post-abdominal segment and lesser amount and thinner spines on the post-abdominal segment.

Podobursa primitiva n. sp.

Plate 39, figures 6-8

Derivation of Name: Due to its appearance as oldest known species of genus *Podobursa* WISNIOWSKI.

Holotype: The specimen on plate 39, figure 6. Sample 97-UKT- 59. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 38 specimens.

Description: Test of four segments. Cephalis small, hemispherical to dome-shaped, smooth, poreless without horn. Thorax and abdomen increasing in width gradually, again poreless, smooth, subtrapezoidal in outline. Both collar and lumbar strictures indistinct only marked by shallow depressions. Stricture between abdomen and post-abdominal segment well marked by sharp changing in outline. Post-abdominal segment large, bulbous, spherical with large hexagonal pore frames and large circular to subcircular pores. Short to moderately long, needle-like spines present on post-abdominal segment, 4-5 visible at one side of the test, radiating all directions. Tube long, in different shape, sometimes uniform in width, sometimes gradually increasing in width with a same pore frames as post-abdominal segment.

Measurements (μm):

(Based on the 4 specimens, only 2 of them are complete)

	HT	Min.	Max.	Av.
Length of cephalis	20	15	20	18.5
Width of cephalis	25	25	33	29
Length of thorax	27	20	27	23
Width of thorax	33	33	45	39
Length of abdomen	27	27	27	27
Width of abdomen	67	55	73	65
Length of post-abdominal segment	147	113	150	137.5
Width of post-abdominal segment	193	160	225	193
Length of tube	347	340	347	343.5
Max. width of tube	80	65	80	75
Total length of the test	567	520	567	543.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa primitiva* n. sp. has been compared to *P. akayi* n. sp. and *P. galeata* n. sp. under latter species. It differs from *P. turriformis* n. sp. and *P. yazgani* n. sp. by possessing less distinctive apical part. It can be differentiated also from *P.* sp. A by having more globular post-abdominal segment instead of spindle-shaped.

Podobursa turriformis n. sp.

Plate 39, figures 9-11

Derivation of Name: From the Latin *turriformis*= tower-shaped.

Holotype: The specimen on plate 39, figure 9. Sample 97-UKT-123. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (see locality description).

Material: 21 specimens.

Description: Test of four segments. Cephalis small, hemispherical to dome-shaped, poreless with long, robust, prominent, needle-like horn, tapering distally. Thorax much broader, subtrapezoidal in outline, poreless. Abdomen more distinctive than the previous segments, disc-shaped with small nodes on its surface. Collar stricture indistinctive, lumbar stricture more prominent with deep depression. Stricture between abdomen and first post-abdominal segment marked by a deep depression and sharp changing in outline and one row of pores, 6-7 visible at one side of test, present there. Post-abdominal segment large, bulbous, spherical with large polygonal (mainly hexagonal) pore frames and circular pores with straight, long needle-like spines at its centre as a row, 4-5 visible at one side of test, laterally. Tube moderately long, roughly cylindrical with a same pore structure as post-abdominal segment, sometimes slightly expanding on its midway or on its distal part.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	17	17	20	19
Width of cephalis	27	27	30	29
Length of thorax	20	20	25	21.5
Width of thorax	40	40	45	41.5
Length of abdomen	33	33	40	37.5
Width of abdomen	60	60	70	65
Length of post-abdominal segment	100	100	140	121.5
Width of post-abdominal segment	134	134	180	161
Length of tube	?	125	125	125
Max. width of tube	47	47	60	52
Total length of the form (Incl. horn)	?	385	400	392.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa turriformis* n. sp. has been compared to *P. akayi* n. sp., *P. galeata* n. sp. and *P. primitiva* n. sp. under latter species. It differs from *P. yazgani* n. sp. by having many and robust spines on the medial part of post-abdominal segment, longer test and tube without

triangular projections distally. Post-abdominal segment of the *P. turriformis* n. sp. is more globular than that of *P.* sp. A.

Podobursa yazgani n. sp.

Plate 40, figures 1-2

Derivation of Name: This species is named for Dr. Evren YAZGAN, General Directorate of Mineral Research and Exploration (MTA), Ankara, Turkey, in honour of his contributions to the study of Turkish geology.

Holotype: The specimen on plate 40, figure 1. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 10 specimens.

Description: Test of four segments. Cephalis small, conical to hemispherical in outline with a needle-like horn. Thorax broader and subtrapezoidal in outline. Abdomen disc-shaped with small nodes on its surface. Both cephalis, thorax and abdomen poreless. Collar stricture indistinct, lumbar stricture marked by a deep depression and for the first time, row of pores present, 14-15 circular small pores visible laterally at one side of test, at the stricture between abdominal and first post-abdominal segment. Post-abdominal segment large, bulbous with a big polygonal (mainly hexagonal) pore frames and circular to semicircular pores. On the surface of the post-abdominal segment, lesser amount (2 of them visible laterally at one side of test) thin, needle-like spines present radiates to all directions. Tube long, roughly cylindrical with a same pore frames as post-abdominal segment, slightly expanding distally and with triangular projections at the distal end.

Measurements (µm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	24	20	25	23
Width of cephalis	28	20	30	26
Length of thorax	24	24	30	26
Width of thorax	44	42	45	43.5
Length of abdomen	40	35	45	40
Width of abdomen	64	60	65	63
Length of post-abdominal segment	80	80	110	101
Width of post-abdominal segment	124	120	140	128
Length of tube	96	96	125	112
Max. width of tube	44	44	60	49.5
Total length of the form (incl. horn)	288	288	350	312.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa yazgani* n. sp. has been compared to *P. akayi* n. sp., *P. galeata* n. sp., *P. primitiva* n. sp. and *P. turriformis* n. sp. under latter species. It differs from *P.* sp. A by possessing globular post-abdominal segment, instead of spindle-shaped.

Podobursa sp. A

Plate 40, figure 3

Brief Definition: Test roughly broad, spindle-shaped with four segments. Cephalis small with short horn. Thorax and abdomen increasing in width gradually and subtrapezoidal in outline. All cephalis thorax and abdomen possibly smooth, poreless. Collar and lumbar strictures indistinct marked only by shallow depressions. Post-abdominal segment spindle-shaped with sharp triangular central part with many thick, long needle-like spines, 7-8 visible at one side of the test. Tube moderately long and tapering distally.

Measurements (µm):

(Based on the 1 specimen)

Length of cephalis	40
Width of cephalis	55
Length of thorax	40
Width of thorax	75
Length of abdomen	45
Width of abdomen	105
Length of post-abdominal segment	130
Width of post-abdominal segment	265
Length of tube	125
Max. width of tube	65
Total length of the form	410

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Podobursa* sp. A has been compared to the other species of the genus *Podobursa* WISNIOWSKI quoted here under latter species.

Genus ***Syringocapsa*** NEVIANI, 1900

Syringocapsa NEVIANI

NEVIANI, 1900, p. 662

Type Species: *Theosyringium robustum* VINASSA, 1901.

Syringocapsa extansa n. sp.

Plate 40, figures 4-5

Derivation of Name: Due to its highly extended apical part.

Holotype: The specimen on plate 40, figure 4. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, and Antalya, Turkey (See locality description).

Material: 21 specimens.

Description: Test with four segments. Cephalis small, conical, poreless with moderately long tapering horn. Thorax and abdomen gradually increase in width, subtrapezoidal in outline, thorax poreless, abdomen with irregular, many circular small pores. Collar and lumbar strictures indistinct only marked by shallow depressions. Strictures between abdomen and post-abdominal segment more prominent marked by abrupt changing in outline. Post-abdominal segment large, bulbous with many, small, circular and irregular pores. Small remnants of tube present at the end of the post-abdominal segment.

Measurements (µm):

(Based on the 2 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	25	25	25	25
Width of cephalis	45	35	45	40
Length of thorax	25	25	35	30
Width of thorax	60	55	60	57.5
Length of abdomen	40	40	40	40
Width of abdomen	80	75	80	77.5
Length of post-abdominal segment	175	175	200	187.5
Width of post-abdominal segment	175	175	185	180
Total length of the test (Incl. horn and small part of tube)	345	345	375	360

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Syringocapsa extansa* n. sp. differs from both *S. batodes* DE WEVER and *S. turgida* BLOME by having horn and both abdominal and post-abdominal segments with small pores instead of large polygonal pore frames.

Syringocapsa rhaetica KOZUR & MOSTLER, 1981

Plate 40, figure 6

Syringocapsa rhaetica KOZUR & MOSTLER

KOZUR & MOSTLER, 1981, p. 87, pl. 9, fig. 2

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Zlambachgraben, Austria; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Syringocapsa turgida BLOME, 1984
Plate 40, figures 7-8

Syringocapsa turgida BLOME

BLOME, 1984, p. 53, pl. 14, figs. 2, 6, 7, 16

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Syringocapsa sp. A
Plate 40, figure 9

Brief Definition: Cephalothorax large, dome-shaped, poreless without horn. Abdomen wider, disc- shaped with small, irregular many semicircular pores. Collar stricture indistinct, lumbar stricture prominent marked by deep depression with one row of circular pores. Stricture between abdominal and post-abdominal segments same as lumbar stricture with row of large pores. Post-abdominal segment large, bulbous with a large polygonal (trigonal to hexagonal) pore frames and elliptical pores in different size. Wide remnants of tube present at the end of post-abdominal segment with possibly small pores.

Measurements (μm):

(Based on the 1 specimens)

Length of cephalis	27
Width of cephalis	40
Length of thorax	30
Width of thorax	57
Length of abdomen	40
Width of abdomen	77
Length of post-abdominal segment	150
Width of post-abdominal segment	187
Total length of test (incl. tube)	287

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: It differs from *Syringocapsa turgida* BLOME by possessing larger post-abdominal segment with larger pore frames.

Syringocapsa sp. B
Plate 40, figure 10

Brief Definition: Cephalothorax large, dome-shaped, poreless without horn. Abdomen wider, disc-shaped without pores. Collar strictures indistinct, lumbar stricture prominent marked by deep depression. Stricture between abdominal and post-abdominal segment with row of medium sized circular to ellipsoidal pores. Post-abdominal segment bulbous, slightly spindle-shaped with small, irregular, circular pores. Tube long, slender and uniform in width.

Measurements (μm):

(Based on the 1 specimen)

Length of cephalis	17
Width of cephalis	33
Length of thorax	20
Width of thorax	43
Length of abdomen	33
Width of abdomen	63
Length of post-abdominal segment	103
Width of post-abdominal segment	107
Length of tube	67
Width of tube	23
Total length of test (incl. tube)	227

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Syringocapsa* sp. B differs from *S. extansa* n. sp. by absence of horn and wider apical part.

FAMILY **TRIASSOCAMPIDAE** KOZUR & MOSTLER, 1981

Genus ***Annulotriassocampe*** KOZUR, 1994

Annulotriassocampe KOZUR

KOZUR in KOZUR & MOSTLER, 1994, p. 249

Type species: *Annulotriassocampe baldii* KOZUR, 1994.

Annulotriassocampe baldii KOZUR, 1994 Group

Plate 41, figures 1-2

Annulotriassocampe baldii KOZUR

KOZUR in KOZUR & MOSTLER, 1994, pp. 249-250, pl. 1, figs. 1a, b

Triassocampe baldii (KOZUR, 1994)

SUGIYAMA, 1997, p. 188, fig. 49-6

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.)- late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Balaton Highland, Hungary; Mino Terrane, Central Japan; Sugozu Measured Section, Alakircay Nappe and Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Group includes forms which have both wider and slender apical parts.

Annulotriassocampe multisegmantatus n. sp.

Plate 41, figures 3-6

Derivation of Name: Due to its many post-abdominal segments.

Holotype: The specimen on plate 41, figure 3. Sample 96 UKT-530. Deposited at MTA.

Type Locality: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey. (See locality description)

Material: More than 50 specimens.

Description: With the character of genus. Test long, subconical to subcylindrical with 13 to 14 post-abdominal segments. Cephalothorax dome-shaped, smooth and poreless. Cephalic part hemispherical, thoracic part subtrapezoidal. Both collar and lumbar strictures indistinct. Abdomen subtrapezoidal to hoop-like with rare pores as ring mainly covered by microgranular silica. Post-abdominal segments slightly increasing in width until ninth segment then slightly decreasing in width, cylindrical to inverse subtrapezoidal in outline, elevated above moderately deep, smooth strictures. All post-abdominal segments display one ring of pores bordered by only upper ring. Lower ring mainly reducing on all segments. Pores mainly small and circular, 13-14 of them visible at one side of the test, laterally.

Measurements (μm):

(Based on the six specimens, only three of them are complete)

	HT	Min.	Max.	Av.
Length of cephalis	15	15	16	15
Width of cephalis	30	25	36	30
Length of thorax	20	20	20	20
Width of thorax	40	40	44	41
Length of abdomen	20	20	25	23
Width of abdomen	42	42	55	50
Max. width of the test	100	88	110	100.5
Total length of test	365	330	405	367

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Annulotriassocampe multisegmantatus* n. sp. differs from *A. baldii* KOZUR and *A. sulovensis* (KOZUR & MOCK) by having longer test and reducing lower border rings on all segments.

Annulotriassocampe proprium (BLOME, 1984)

Plate 41, figure 7

Triassocampe proprium BLOME

BLOME, 1984, p. 59, pl. 16, figs. 4, 11, 14

Annnulotriassocampe proprium (BLOME, 1984)

KOZUR in KOZUR & MOSTLER, 1994, p. 249

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E.*

primitia Con Z.)- early Norian (*E. abneptis* Con. Z.)- ? late middle Norian.

Occurrence: East-central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Although the form is broken, robust triradiate horn on cephalis and property of the other segments are enough to describe this form as *Annulotriassocampe proprium* (BLOME). In this form at cephalothorax, junction of spicular system to wall could be traced as pores at surface.

Annulotriassocampe sulovensis (KOZUR & MOCK, 1981)

Plate 41, figure 8

Triassocampe sulovensis KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, p. 99, pl. 13, fig. 3

?YEH, 1989, p. 76, pl. 2, fig. 13

YEH, 1990, p. 29, pl. 7, fig. 8

NON GORICAN & BUSER, 1990, p. 160, pl. 12, figs. 4, 5 (=*Annulotriassocampe eoladinica* KOZUR & MOSTLER, 1994)

Annulotriassocampe sulovensis (KOZUR & MOCK, 1981)

KOZUR in KOZUR & MOSTLER, 1994, p. 249

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; middle Carnian.

Occurrence: Westkarpats;? East-Central Oregon, USA; Busuanga Island, Philippines; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Annulotriassocampe ? sp. A

Plate 41, figure 9

Brief Definition: Test slender and conical with 4-5 post-abdominal segments. Cephalothorax smooth with rare pores. Cephalic part hemispherical with short apical and two lateral horns. One of the lateral horn quite bigger than the other and apical horn. All horns triradiate with wide grooves and thin ridges. Abdomen and post-abdominal segments inverse subtrapezoidal to hoop-like in shape. Strictures relatively deep, smooth and poreless. Ring of pores mainly located at proximal parts of both abdominal and post-abdominal segments with small to medium sized subcircular to elliptical pores.

Measurements (μm):

(Based on the 1 specimen)

Length of cephalis	31
Width of cephalis	53
Length of thorax	31
Width of thorax	62.5
Length of abdomen	31
Width of abdomen	67
Total length of test (incl. apical horn)	247
Max. width of test	100

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Annulotriassocampe* ? sp. A differs from *A. proprium* (BLOME) by having well-developed lateral horns. It is tentatively assigned to genus *Annulotriassocampe* KOZUR due to this feature.

Genus *Triassocampe* DUMITRICA, KOZUR & MOSTLER,1980

Triassocampe DUMITRICA, KOZUR & MOSTLER

DUMITRICA, KOZUR & MOSTLER,1980, pp. 25-26

Type species: *Triassocampe scalaris* DUMITRICA, KOZUR & MOSTLER, 1980.

Triassocampe scalaris DUMITRICA,KOZUR & MOSTLER, 1980 s. l.

Plate 41, figure 10

Triassocampe scalaris DUMITRICA, KOZUR & MOSTLER

DUMITRICA, KOZUR & MOSTLER, 1980, p. 26, pl. 9, figs. 5, 6, 11; pl. 14, fig. 2

MIZUTANI & KOIKE, 1982, pl. 4, fig. 4

GORICAN & BUSER, 1990, p. 159, pl. 12, figs. 2, 3

Triassocampe deweveri (NAKASEKO & NISHIMURA, 1979)

YAO, 1982, p. 64, pl. 1, figs. 1, 2 **NON** 3

YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 1

Triassocampe sp.

MARTINI, DE WEVER, ZANINETTI, DANIELIAN & KITO, 1989, pl. 1, fig. 1

Triassocampe scalaris scalaris DUMITRICA, KOZUR & MOSTLER

KOZUR & MOSTLER, 1994, p. 145, pl. 44, figs. 1-6, 10-12; pl. 45, figs. 1-2; pl. 47, figs. 2, 3

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. / ? *P. priscus* Rad. Subz.- *M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.).

Total Range (this study and published): Middle Triassic; early Ladinian- late Ladinian (*M. cochleata* Rad. Z. / *S. rarauana* Rad. Subz.).

Occurrence: Southern Alps; Inuyama area and Gifu Prefecture, Central Japan; Slovenia; Lagenegro Basin, Southern Italy; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

FAMILY **UNUMIDAE** KOZUR, 1984a

Genus ***Praeprotunuma*** n. gen.

Type species: *Praeprotunuma antiqua* n. gen., n. sp.

Derivation of Name: For the precedent occurrence for *Protunuma* ICHIKAWA & YAO.

Description: Test spindle-shaped with five to six post-abdominal segments. Test increasing in width until third post-abdominal segment then decreasing in width. Cephalothorax conical without pores and plicae and with small apical horn. Collar stricture indistinct covered by microgranular silica. Lumbar stricture marked by shallow depression with rare pores. Abdomen subtrapezoidal without pores but rarely with some plicae. First post-abdominal segment easily distinguished by possessing many scattered circular pores and discontinuous plicae. Relatively deep strictures present between abdomen and first post-abdominal and first to second post-abdominal segments. Subsequent strictures indistinct. 8-9 plicae mainly discontinuous, not straight but some of them run from abdomen to last post-abdominal segment. Between costae scattered, mainly circular to subcircular pores present. The amount of the row of pores between two costae vary between one to five mainly related to irregular and discontinuous organisation of the costae. Aperture small and circular.

Included Species:

Praeprotunuma antiqua n. gen., n. sp.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Baja California, Mexico; Northwest Croatia; North Island, New Zealand; Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Praeprotunuma* n. gen. differs from *Protunuma* ICHIKAWA & YAO by having small apical horn; smooth, poreless noncostate apical part instead of with many scattered pores and costate and discontinuous, irregular costae instead of more continuos and regular costae.

Praeprotunuma antiqua n. gen., n. sp.
Plate 41, figures 11-15

Unnamed Nasellaria

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pl. 4, fig. 8

Unnamed Nasellarian

AITA & SPORLI, 1994, pl. 6, fig. 16

Nasellaria gen. et sp. indet.

FUJII, HATTORI & NAKAJIMA, 1993, pl. 3, fig. 16

Nasellaria gen. et sp. indet.

HALEMIC & GORICAN, 1995, pl. 1, fig. 18

Derivation of Name: For it is appearance as the oldest representatives of family Unumidae.

Holotype: The specimen on plate 41, figure 11. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Same as genus.

Measurements (μm):

(Based on the 6 specimens)

	HT	Min.	Max.	Av.
Length of cephalothorax	20	20	28	22
Width of cephalothorax	28	28	32	30
Length of abdomen	23	18	23	21
Width of abdomen	45	42	50	45
Max. width of the test	105	90	120	106
Total length of the test (incl. apical horn)	182	180	217	191.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Baja California, Mexico; Northwest Croatia; North Island, New Zealand; Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Same as genus.

FAMILY **XIPHOTHECIDAE** KOZUR & MOSTLER,1981

Genus ***Senelella*** n. gen.

Type species: *Senelella triassica* n. gen., n. sp.

Derivation of Name: This genus is dedicated to Dr. Mustafa SENEL, General Directorate of Mineral Research and Exploration (MTA), in honouring his contributions to the knowledge of Taurus Mountains Geology and his kind personality.

Description: Test long and roughly subcylindrical with seven to eight post-abdominal segments. Cephalothorax conical, imperforate sometimes with small horn. Collar stricture indistinct. Lumbar stricture more distinct marked by shallow depression. Abdomen hoop-like and poreless. Rest of segments has polygonal (trigonal-pentagonal) pore frames and big circular to elliptical pores. First post-abdominal segment big, bulbous with many rudimentary spines. Second post-abdominal segment globose and has a same feature like first post-abdominal segment contains mainly six, long needle-like spines. Following two segments subcylindrical and joint each other with a gentle constrictions and have an approximately same width as abdomen. Next segments more globose and bigger than the previous ones. Last three segments closely spaced with sharp constrictions.

Included species:

Senelella triassica n. gen., n. sp.

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could easily be distinguished from genus *Xiphotheca* DE WEVER by having bigger and globular first and second post-abdominal segments with many spines.

Senelella triassica n. gen., n. sp.

Plate 42, figures 1-5

? *Xiphotheca* sp. A

YEH, 1992, **ONLY** pl. 9, fig. 8 **NON** 9

Derivation of Name: Because of the occurrence in Triassic period.

Holotype: The specimen on plate 42, figure 1. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 22 specimens.

Description: Same as genus.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalothorax	40	33	41	38
Width of cephalothorax	41	41	46	45
Length of abdomen	25	25	35	29
Width of abdomen	67	60	73	67
Total length of post-abdominal segment	616	553	616	584
Max. width of post-abdominal segment	158	140	165	156
Total length of the test	683	606	683	644

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Uson Island, Philippines; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Same as genus.

Genus ***Xiphotheca*** DE WEVER, 1979

Xiphotheca DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 93

Type Species: *Xiphotheca karpenissionensis* DE WEVER, 1979.

Xiphotheca irregularis n. sp.

Plate 42, figures 6-7

Derivation of Name: Because of the irregular organisation of its post-abdominal segments.

Holotype: The specimen on plate 42, figure 6. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 7 specimens.

Description: Test long mainly with nine post-abdominal segments. Cephalis hemispherical to dome- shaped and poreless, thorax subtrapezoidal in outline, poreless with many nodes. Both collar and lumbar strictures indistinct. Abdominal segment again subtrapezoidal in outline with small node like structures and poreless. Stricture between abdominal segment and first post-abdominal segment prominent marked by deep depressions with one row of circular pores (10 of them at one side of test). First post-abdominal segment bulbous with elevated polygonal (mainly trigonal) pore frames and irregularly arranged moderately big, circular to elliptical pores. Second post-abdominal segment bulbous, like abdominal segment but decreasing in both width and length and has same pore frames as abdominal segment. Subsequent post-abdominal segments closely spaced, decreasing in width while length approximately become constant until the fifth post-abdominal segment then increasing in width distally. These post-abdominal segments mainly disc-shaped to hemispherical in outline and have irregular pores in different size. Strictures between post-abdominal segments again distinct marked by deep depressions sometimes with pores same as those of post-abdominal segments.

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	20	20	20
Width of cephalis	27	27	30	29
Length of thorax	23	23	25	24.5
Width of thorax	47	45	47	45.5
Length of abdomen	27	27	35	31
Width of abdomen	67	62	75	68
Total length of post-abdominal segments	500	380	500	432
Max. width of post-abdominal segments	127	110	127	121
Total length of the test	567	450	567	501

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Xiphotheca irregularis* n. sp. differs from *X. longa* KOZUR & MOCK by having elevated pore frames at the post-abdominal segments and gradual tapering until the centre of the form and expanding distally instead of more

globular and uniform post-abdominal segments after first post-abdominal segment. It can be differentiated from *Senelella triassica* n. gen., n. sp. by possessing not well-developed second post-abdominal segment and absence of spine both on first and second post-abdominal segments.

Xiphotheca sp. cf. *X. karpenissionensis* DE WEVER, 1979

Plate 42, figure 12

cf. *Xiphotheca karpenissionensis* DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979, p. 93, pl. 7, figs. 1, 2 **NON** 3, 4, 5.

DE WEVER, 1982.b, pp. 318-319, pl. 47, figs. 2, 3, 5 **NON** 4

HALEMIC & GORICAN, 1995, pl. 1, fig. 25

Range (this study): Late Triassic; middle Carnian.

Occurrence: Haciyunuslar Measured Section, Huglu Unit, Beysehir-Hoyran Nappe, Bozkir, Konya, Turkey.

Remarks: Reconstruction of *Xiphotheca karpenissionensis* DE WEVER realised from the many broken parts of different species of genus *Xiphotheca* DE WEVER. Specimen showing at pl. 7 fig. 3 could belongs to *X. rugosa* BRAGIN and pl. 7, fig. 4 in the DE WEVER et al (1979) belongs to *X. longa* KOZUR & MOCK. Since the form long and delicate to find the complate form is difficult. Although the highly corrosion appear at the specimen from Haciyunuslar Measured Section, outer shape is similar to those of *X. karpenissionensis* DE WEVER.

Xiphotheca longa KOZUR & MOCK, 1981 emend. herein

Plate 42, figures 13-14

Xiphotheca sp.

PESSAGNO in PESSAGNO, FINCH & ABBOTT, 1979, pl. 5, fig. 5

Xiphotheca longa KOZUR & MOCK

KOZUR & MOCK in KOZUR & MOSTLER, 1981, pp. 113-114, pl. 41, fig. 2

YEH, 1989, p. 71, pl. 8, fig. 1

Xiphotheca karpenissionensis DE WEVER

SATO, MURATA & YOSHIDA, 1986, fig. 16, no. 14

OTSUKA, KAJIMA & HORI, 1992, pl. 3, figs. 17-18

Xiphotheca cf. *longa* KOZUR & MOCK

OTSUKA, KAJIMA & HORI, 1992, pl. 3, fig. 19

Emended Definition: Test gradually increase until first post-abdominal segment. First post-abdominal segment more bulbous than the other segments.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic: latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Baja California, Mexico; West Karpats: Oman; East-Central Oregon, USA; Kyushu. Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Xiphotheca pseudolonga n. sp.

Plate 42, figures 8-11

Derivation of Name: Because of its similarity to *X. longa* KOZUR & MOCK but different post-abdominal segments.

Holotype: The specimen on plate 42, figure 8. Sample 98-UKT-61. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 8 specimens.

Description: Test long mainly with ten post-abdominal segments. Cephalis hemispherical to dome- shaped and poreless, thorax subtrapezoidal in outline and poreless. Collar and lumbar strictures indistinct and both poreless. Abdomen disc-shaped with many nodes on its surface. Post-abdominal segments bulbous. disc-shaped with elevated polygonal (mainly trigonal and hexagonal) pore frames and irregularly arranged, mainly small to medium sized circular to elliptical pores. They are closely

spaced and width of them constant. Length of the first post-abdominal segment slightly bigger than the subsequent ones but after that it becomes constant again. Strictures between abdominal segment and first post-abdominal segment and subsequent ones prominent always marked by deep depressions with one row of circular pores (14 of them at one side of test).

Measurements (μm):

(Based on the 3 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	20	20	25	22
Width of cephalis	35	27	35	32
Length of thorax	25	22	30	26
Width of thorax	50	40	60	50
Length of abdomen	35	30	35	32.5
Width of abdomen	70	67	80	76
Total length of post-abdominal segments	-	390	500	445
Max. width of post-abdominal segment	120	105	120	108
Total length of the test	-	470	572	521

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Xiphotheca pseudolonga* n. sp. differs from both *X. longa* KOZUR & MOCK and *X. irregularis* n. sp. by having uniform, closely spaced disc-shaped post-abdominal segments.

Xiphotheca rugosa BRAGIN, 1991
emend. herein

Plate 42, figures 15-18; Plate 43, figures 1-5

Xiphotheca karpenissionensis DE WEVER

DE WEVER in DE WEVER, SANFLIPPO, RIEDEL & GRUBER, 1979 **ONLY** pl. 7, fig. 3

Xiphotheca rugosa BRAGIN

BRAGIN, 1991a, pp. 107-108, pl. 5, figs. 11, 13.

Xiphotheca sp.

OTSUKA, KAJIMA & HORI, 1992, pl. 3, figs. 20, 21

Xiphotheca sp.

HALAMIC & GORICAN, 1995, **ONLY** pl. 1, fig. 24

Emended Description: Test long, roughly cylindrical with 15 to 24 post-abdominal segments. Cephalothorax imperforate, conical with sometimes rudimentary horn. Collar stricture indistinct. Lumbar stricture prominent marked by deep depression. Abdomen disc-shaped and imperforate. First post-abdominal segment globular approximately two times bigger than abdomen with many circular pores. Following 9-17 post-abdominal segments (if two rows of pores coincide one segment as distal globose segments) straight, tube like, smaller than first post-abdominal segment with straight row of circular to subcircular pores (7-8 at one side of the test, laterally). Last five to six post-abdominal segments become more globular than the previous ones. Every segment has two rows of circular to subcircular pores. Aperture small and circular.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. triangularis* Con. Z.).

Occurrence: Karpenission, Greece; Sikhoto-Alin, Fareast Russia; Oman; Northwestern Croatia; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: Complate material from Yaylakuzdere Measured Section indicates that amount of straight post-abdominal segments vary from 9 to 17 which could be explained by intraspecific variability.

Xiphotheca ? transitus n. sp.

Plate 43, figures 6-8

Derivation of Name: Because of its possible transitional position between genus *Xiphotheca* DE WEVER and genus *Podobursa* WISNIOWSKI.

Holotype: The specimen on plate 43 , figure 6. Sample 98-UKT-62. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes,

Kemer, Antalya, Turkey (See locality description).

Material: 19 specimens.

Description: Test long, roughly slender, cylindrical in shape with six post-abdominal segments. Cephalis small, hemispherical, poreless with rudimentary horn. Thorax and abdomen increasing in width gradually, subtrapezoidal in shape again poreless covered by microgranular silica. Collar stricture less prominent, lumbar stricture deeper both covered by microgranular silica. First post-abdominal segment bulbous, roughly spherical with 8-10 primary spines medially. Spines long, thin, needle-like, slightly tapering distally and circular in cross-section. First post-abdominal segment possesses elevated polygonal (mainly trigonal) pore frames with small to medium sized pores. Second and third post-abdominal segments roughly cylindrical in shape, decreasing in width drastically and separated from each other and the other segments with shallow strictures and porous with many circular to ellipsoidal pores in different size. Last three post-abdominal segments globular than the previous two segments but decreasing in width gradually towards the last segment. They have many pores in different size and short to medium sized 6-8 needle-like spines at their centre. These segments separated each other by more prominent and deeper strictures. Test terminated short, porous, slightly tapering tube. Aperture small and circular.

Measurements (μm):

(Based on the 7 specimens, only two of them are complate)

	HT	Min.	Max.	Av.
Length of cephalis	13	13	15	14
Width of cephalis	33	30	33	31.5
Length of thorax	27	25	27	26.5
Width of thorax	53	45	53	49
Length of abdomen	40	35	40	38
Width of abdomen	80	65	80	75
Total length of post-abdominal segments	753	660	753	706.5
Max. width of post-abdominal segment	147	130	150	141
Total length of the test	833	740	833	786.5

Range (this study): Late Triassic; early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Xiphotheca* ? *transitus* n. sp. is tentatively assigned to genus *Xiphotheca* DE WEVER because of its post-abdominal segments with strong spines. *Xiphotheca* DE WEVER could be the forerunner of genus *Podobursa* WISNIOWSKI. It looks like reducing of post-abdominal segments resulting in tube like extension distally. It differs from *Senelella triassica* n. gen., n. sp. by having not bulbous second post-abdominal segment.

NASSELLARIA INCERTAE SEDIS

Genus ***Bipedis*** DE WEVER, 1982a

Bipedis DE WEVER
DE WEVER, 1982a, pp. 192-193
?*Parabipedis* YEH & CHENG
YEH & CHENG, 1996, p. 16

Type species: *Bipedis calvabovis* DE WEVER, 1982a.

Bipedis acrostylus BRAGIN, 1991a
Plate 43, figures 9-11

Nassellaria gen. et sp. Indet. sp. A
YAO, 1982, pl. 3, fig. 14
YAO, MATSUOKA & NAKATANI, 1982, pl. 2, fig. 6
Nassellaria B
YOSHIDA, 1986, pl. 9, figs. 12, 13
Undescribed Nassellarian
BLOME, REED & TAILLEUR, 1989, pl. 33.2, fig. 2
Triassobipedis ? sp. 1
CARTER, 1990, pl.1, fig. 12
Bipedis acrostylus BRAGIN
BRAGIN, 1991a, p. 107, pl. 7, fig. 8
CARTER, 1993, pp. 109-110, pl. 20, figs. 10, 11, 12
BRAGIN & TEKIN, 1996, pl. 1, fig. 8
SUGIYAMA, 1997, p. 175, fig. 50-17

Nassellaria Indet. gen. A sp. A
YEH, 1992, p. 69, pl. 5, fig. 7
Nassellaria Indet. gen. B sp. A
YEH, 1992, p. 70, pl. 6, figs. 1-3
Parabipedis pessagnoi YEH & CHENG
YEH & CHENG, 1996, p. 16, pl. 7, figs. 1-15

Range (this study): Late Triassic; late Norian-Rhaetian.

Total Range (this study and published): Late Triassic; late Norian-Rhaetian.

Occurrence: Inuyama Area, Gifu Prefecture and Mino Terrane, Central Japan; Alaska, USA; Sikhoto-Alyn, Fareast Russia; Queen Charlotte Islands, British Columbia, Canada; Uson and Busuanga Islands, Philippines; Ankara Ophiolitic Melange, Eryaman, Ankara and Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Genus ***Canesium*** BLOME, 1984

Canesium BLOME
BLOME, 1984, p. 53

Type Species: *Canesium lentum* BLOME, 1984.

Canesium lentum BLOME, 1984
Plate 43, figure 12

Eucyritidium (?) sp. A
NAKASEKO & NISHIMURA, 1979, p. 78, pl. 9, figs. 5, 9
YAO, 1982, pl. 2, figs. 9-10
YAO, MATSUOKA & NAKATANI, 1982, pl. 1, fig. 17
Canesium lentum BLOME
BLOME, 1984, pp. 53-54, pl. 14, figs. 3, 8, 11; pl. 17, figs. 13
YOSHIDA, 1986, pl. 6, figs. 1, 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. triangularis* Con. Z.).

Total Range (this study and published): Late Triassic; late Carnian- early Norian (*E. triangularis* Con. Z.)- ? late middle Norian.

Occurrence: Inuyama Area and Gifu Prefecture, Central Japan; East-Central Oregon, USA; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Genus ***Castrum*** BLOME, 1984

Castrum BLOME
BLOME, 1984, p. 54

Type Species: *Castrum perornatum* BLOME, 1984.

Castrum perornatum BLOME, 1984
Plate 43, figures 13-14

Dictyomitrella sp. B
DE WEVER in DE WEVER, SAN FLIPPO, RIEDEL & GRUBER, 1979, p. 90, pl. 5, fig. 17
DE WEVER, 1982, p. 299, pl. 47, fig. 10
Castrum perornatum BLOME
BLOME, 1984, p. 54, pl. 14, figs. 4, 9, 12, 14, 18; pl. 17, fig. 14
YEH, 1989, p. 71, pl. 8, fig. 9

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian.

Total Range (this study and published): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian- ? late middle Norian.

Occurrence: Karpenission, Greece; East-central Oregon, USA; Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Genus ***Enoplocampe*** SUGIYAMA, 1997

Enoplocampe SUGIYAMA
SUGIYAMA, 1997, p. 154

Type Species: *Enoplocampe yehae* SUGIYAMA, 1997.

***Enoplocampe* sp. A**
Plate 43, figure 15

Brief definition: Test long, mainly cylindrical in outline with seven or more post-abdominal segments. Cephalis spherical to hemispherical with short, triradiate horn. Thorax again prominent with three short, strong triradiate

arms. Abdomen and post-abdominal segments cylindrical and uniform in width.

Measurements (μm):

(Based on the 1 specimen)

Total length of test	285
Max. width of test	65

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from *Enoplocampe yehae* SUGIYAMA by having longer test and more amount of post-abdominal segments (7 instead of 3).

Genus ***Globolaxtorum*** CARTER, 1993

Globolaxtorum CARTER

CARTER, 1993, p. 110

Type Species: *Globolaxtorum tozeri* CARTER, 1993.

Globolaxtorum cristatum CARTER, 1993

Plate 44, figure 1

Globolaxtorum cristatum CARTER

CARTER, 1993, pp. 110-111, pl. 19, figs. 11, 12, 13, 17

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Islands, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Globolaxtorum hullae (YEH & CHENG, 1996)

Plate 44, figure 2

Syringocapsa sp. A

YAO, 1982, pl. 3, fig. 12

Syringocapsa sp. C

YOSHIDA, 1986, pl. 6, figs. 13, 14

Katroma hullae YEH & CHENG

YEH & CHENG, 1996, pp. 14-15, pl. 8, figs. 1, 2, 6, 7, 12, 13

Globolaxtorum hullae (YEH & CHENG, 1996)

SUGIYAMA, 1997, p. 179, fig. 50-21

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; ? late Norian- Rhaetian.

Occurrence: Inuyama Area, Gifu Prefecture and Mino Terrane, Central Japan; Busuanga Island, Philippines; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

***Globolaxtorum* ? sp. A**

Plate 44, figure 3

Globolaxtorum ? sp. A

CARTER, 1993, p. 112, pl. 19, fig. 20, 21

Brief definition: Test as with genus possess three radially arranged spongy arms (tipped with slender spines) that extend from the most inflated chamber of test (Carter, 1993).

Measurements (μm):

(Based on the 1 specimen)

Max. diameter of test	90
Total length of test, excluding tube	183

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Kunga and Queen Charlotte Island, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: This form was tentatively assigned to genus *Globolaxtorum* by CARTER because of its spongy arms (Carter, 1993).

***Globolaxtorum* sp. B**

Plate 44, figure 4

Brief definition: Test as with genus usually with 12-13 post-abdominal segments and long, thick tube. Cephalis conical without horn, succeeding segments slightly increasing in width until ninth post-abdominal segment while the height of them more or less constant, subtrapezoidal in outline. Ninth segment bulbous with four or five (three of them visible at one side the test) strong, short node like median spine (arm?). Last 3-4 segment decreasing in width gradually, inverse

subtrapezoidal in outline. Tube thick, cylindrical and circular in axial section.

Measurements (μm):

(Based on the 1 specimen)

Length of test, exc. tube	350
Max. diameter of test	115-135

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from the other species of the genus *Globolaxtorum* CARTER by having many post-abdominal segments and strong, node-like medial spines.

Globolaxtorum sp. C

Plate 44, figure 5

Brief definition: Test as with genus, spindle-shaped usually with 8-9 post-abdominal segments. Cephalis conical with long horn, form slightly increasing in width until second post-abdominal segment, then quickly increasing in width until fifth post-abdominal segment reach the maximum width. Fifth segment bulbous with six or seven (four of them visible at one side the test) strong, short to moderately long median spines. Last three- four segments decreasing in width gradually and inverse subtrapezoidal in outline. Tube long and tapering distally.

Measurements (μm):

(Based on the 1 specimen)

Length of test, exc. tube and horn	305-325
Max. diameter of test	175-190

Range (this study): Late Triassic; Rhaetian.

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from other species of the genus *Globolaxtorum* CARTER by having slender shape in apical and distal part.

Genus *Laxtorum* BLOME, 1984 emend. CARTER, 1993

Laxtorum BLOME

BLOME, 1984, p. 56

emend.CARTER, 1993, p. 112

Type Species: *Laxtorum hindei* BLOME, 1984.

Laxtorum capitaneum CARTER, 1993

Plate 44, figure 6

?*Pleesus* sp. A

YEH, 1992, p. 68, pl. 5, fig. 14

Laxtorum capitaneum CARTER

CARTER, 1993, pp. 112-113, pl. 19, figs. 6, 7, 8

?*Laxtorum* sp. cf. *L. capitaneum* CARTER

SUGIYAMA, 1997, pp. 181-182, fig, 50-2

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: ?Uson Island, Philippines; Queen Charlotte Island, British Columbia, Canada; ?Mino Terrane, Central Japan; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Laxtorum perfectum CARTER, 1993

Plate 44, figure 7-9

Laxtorum ? sp. 1

CARTER, 1990, pl. 2, fig. 13

Laxtorum perfectum CARTER

CARTER, 1993, pp. 113-114, pl. 19, figs. 9, 10

Range (this study): Late Triassic; Rhaetian.

Total Range (this study and published): Late Triassic; Rhaetian.

Occurrence: Queen Charlotte Island, British Columbia, Canada; Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Laxtorum sp. aff. *L. perfectum* CARTER, 1993

Plate 44, figure 10

aff. *Laxtorum perfectum* CARTER

CARTER, 1993, pp. 113-114, pl. 19, figs. 9, 10

Range (this study): Late Triassic; Rhaetian

Occurrence: Dikmetas Measured Section, Cataltepe Nappe, Antalya Nappes, Antalya, Turkey.

Remarks: It differs from *Laxtorum perfectum* CARTER by having more bulbous medial part and absence of apical horn.

Genus ***Mostlericyrtium*** n. gen.

Type species: *Mostlericyrtium sitepesiformis* n. gen., n. sp.

Derivation of Name: This genus is dedicated to Prof. Dr. Helfried MOSTLER, Innsbruck University, Innsbruck, Austria, honouring his contributions to the knowledge of Radiolaria, Sponge and Holuthurian Biostratigraphy and for supervising my thesis.

Description: Test cylindrical in outline with many (more than 20) post-abdominal segments. Cephalis long, dome-shaped with vertical horn and rarely with small rudimentary horn, poreless without costae. Collar stricture distinctive with row of pores. Thorax and abdomen subtrapezoidal to hoop-like in outline with sometimes node-like weak costae and pores. Lumbar stricture less distinctive and subsequent strictures indistinct. Post-abdominal segments slightly wider than abdomen and mainly hoop-like (except last segment) in outline and have irregular mainly discontinuous thin to thick costae and many irregular mainly circular pores between them. Aperture not visible or to small.

Included Species:

Mostlericyrtium sitepesiformis n. gen., n. sp.

Mostlericyrtium striata n. gen., n. sp.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could easily be distinguished from the other Nassellaria by having very long length and irregular long weak costae.

Mostlericyrtium sitepesiformis n. gen., n. sp.

Plate 44, figures 11-15

Derivation of Name: From the Latin *stipesiformis*= Stick shape.

Holotype: The specimen on plate 44, figure 11. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Test multicyritid, long and cylindrical in outline. Cephalis long, dome-shaped with prominent vertical horn without apical horn and costae on the surface. Collar stricture distinctive marked by deep depression with one row of circular moderately big pores (14 of them visible at one side of the test). Thorax subtrapezoidal, smaller than cephalis with node-like costae and irregular pores. Lumbar stricture less distinctive marked by a shallow depression with irregular one row of pores. Abdomen subtrapezoidal, slightly wider than thorax and has similar node-like costae. Many (average 28) post-abdominal segments slightly wider than abdomen, hoop-like and have irregular weak discontinuous costae and many irregular mainly circular pores in different size between costae. Strictures between post-abdominal segments indistinct. Aperture not visible or to small.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	50	50	72	57
Width of cephalis	54	48	60	54
Length of thorax	24	24	28	25
Width of thorax	60	60	72	64
Length of abdomen	24	24	30	26
Width of abdomen	74	66	84	75
Width of post-abdominal segments	74	60	74	66
Total length of test	740	670	820	755
Total amount of segments (approx.)	28	25	31	28

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Mostlericyrtium sitepesiformis* n. gen., n. sp. differs from *M. striata* n. gen., n. sp. by having longer and more slender shell and very thin, weak and discontinuous costae instead of thick and more continuos ones on the post-abdominal segments.

Mostlericyrtium striata n. gen., n. sp.
Plate 44, figures 16-18

Derivation of Name: Due to prominent striation on post-abdominal segments.

Holotype: The specimen on plate 44, figure 16. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 27 specimens.

Description: Test multicyritid, long, mainly cylindrical in outline. Cephalis long, dome-shaped with prominent vertical horn. Cephalis long, dome-shaped with vertical horn and sometimes with small rudimentary horn. It mainly poreless without costae. Collar stricture distinctive marked by deep depression and with one row of circular and moderately big pores. Thorax subtrapezoidal to hoop-like in outline smaller than cephalis and with costae and irregular pores. Lumbar stricture less distinctive marked by a shallow depression with irregular one row of pores. Abdomen subtrapezoidal to hoop-like in outline, slightly wider than thorax and has costae mainly continue to post-abdominal segments. Many (average 22) post-abdominal segments mainly hoop-like (except last segment) in outline and slightly wider than abdomen with discontinuous, long costae. Costae irregular, thick and between them many irregular circular to subcircular pores in different size present. Strictures between post-abdominal segments indistinct. Aperture not visible or to small.

Measurements (μm):
(Based on the 4 specimens, only one of them is complate)

	HT	Min.	Max.	Av.
Length of cephalis	40	40	60	49
Width of cephalis	53	53	65	56
Length of thorax	20	20	25	21
Width of thorax	67	60	70	68
Length of abdomen	20	20	25	22.5
Width of abdomen	73	60	75	68
Total length of test	654	-	-	654
Width of post-abdominal segments	87	85	110	96
Total amount of segments (approx.)	22	-	-	22

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Mostlericyrtium striata* n. gen., n. sp. has been compared to *Mostlericyrtium sitepesiformis* n. gen., n. sp. under latter species.

Genus ***Multimonilis*** YEH, 1989

Multimonilis YEH
YEH, 1989, p. 72

Type Species: *Multimonilis pulcher* YEH, 1989.

***Multimonilis* sp. A**
Plate 45, figure 1

Brief Definition: Test conical to slightly spindle-shaped consisting of five or six post-abdominal segments. Cephalis subconical to dome-shaped, imperforate without horn. Thorax to fourth post-abdominal segment increasing in width slowly subtrapezoidal in outline, last one or two post-abdominal segments slightly decreasing in width, inverse subtrapezoidal in outline. Collar stricture indistinct, lumbar stricture and subsequent strictures less prominent marked by shallow depressions. Surface of thorax and abdomen smooth, post-abdominal segments possess irregular small immature nodes.

Measurements (μm):

(Based on the 1 specimen)

Max. width of the test	103
Total length of test	233

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /? *P. priscus* Rad. Subz.)- late Triassic; early Carnian (*T. kretaensis* Rad. Z.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Multimonilis* sp. A differs *M.* sp. B sensu SUGIYAMA by having test without horn and irregular immature nodes. It differs from *M.* sp. B in this study by having more inflated slightly spindle-shaped test.

Multimonilis sp. B

Plate 45, figure 2

Brief Definition: Test slender, subconical in shape with five post-abdominal segments. Cephalis hemispherical to dome-shaped, imperforate without horn. Thorax to last post-abdominal segments increasing in width slowly and subtrapezoidal in outline. Collar stricture indistinct, lumbar stricture and subsequent strictures less prominent marked by shallow depressions. Surface of thorax and abdomen smooth, post-abdominal segments possess two rows of nodes. 8-9 nodes visible at one side of the test, laterally.

Measurements (μm):

(Based on the 1 specimen)

Max. width of the test	107
Total length of test	307

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /*S. fluegeli* Rad. Subz.).

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Multimonilis* sp. B differs from *M.* sp. B sensu SUGIYAMA by having test without horn, wider cephalis, more slender test. It has been compared to *M.* sp. A under latter taxon.

Multimonilis ? sp. C

Plate 45, figure 3

Brief Definition: Test conical to slightly spindle-shaped with three post-abdominal segments. Cephalis subconical to dome-shaped, imperforate with robust, long horn, circular in cross section. Thorax to second post-abdominal segment increasing in width slowly subtrapezoidal in outline, last post-abdominal segment slightly decreasing in width, inverse subtrapezoidal in outline. Collar stricture indistinct, lumbar stricture and subsequent strictures less prominent marked by shallow depressions with one row of pores. Surface of thorax and abdomen smooth, post-abdominal segments possess one or two rows of nodes. In some cases nodes not well-developed at post-abdominal segments.

Measurements (μm):

(Based on the 2 specimens)

Max. width of the test	97-103
Total length of test (without horn)	150-167

Range (this study): Middle Triassic; late Ladinian (*M. cochleata* Rad. Z. /*S. fluegeli* Rad. Subz.)- late Triassic; early Carnian.

Occurrence: Sugozu Measured Section, Alakircay Nappe, Antalya Nappes, Gazipasa, Antalya, Turkey.

Remarks: *Multimonilis* ? sp. C is tentatively assigned to genus *Multimonilis* YEH because of its strong horn occurrence and presence of irregularly arranged nodes on post-abdominal segments. It can be differentiated from the other species of genus *Multimonilis* YEH by these properties.

Genus ***Papiliocampe*** n. gen.

Type species: *Papiliocampe tokerae* n. gen., n. sp.

Derivation of Name: From the Latin *papilio*= Butterfly

Description: Test composed of multicyritid Nassellaria (herein termed as main body) at the centre and ring around of it. Main body cylindrical to subcylindrical in outline with many post-abdominal segments. Cephalis without horn, smooth, poreless, subsequent

segments slightly increasing in width, closely spaced, subtrapezoidal to disc-shaped in outline. Opening large and circular. Ring wide and circular to longitudinally elliptical in outline, smooth, poreless and mainly perpendicular to main body but sometimes concave and with a triangular projection at the continuation of the cephalis.

Included Species:

Papiliocampe tokerae n. gen., n. sp.

Papiliocampe ovalis n. gen., n. sp.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: This genus could easily be distinguished from the other Nassellaria by having small test and prominent ring around it.

Papiliocampe ovalis n. gen., n. sp.
Plate 45, figures 4-5

Derivation of Name: Due to its oval outline.

Holotype: The specimen on plate 45, figure 4. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 6 specimens.

Description: Test as with genus. Main body relatively big, roughly subconical to cylindrical with four post-abdominal segments. Cephalis big, poreless and spherical to hemispherical in outline. Collar stricture less prominent only marked by shallow strictures. Lumbar stricture and subsequent strictures with one or two rows of small to medium sized circular pores. Subsequent segments, closely spaced, subtrapezoidal in outline, slightly increasing in width while the height of them become approximately constant. Sometimes irregular, small and circular pores present on circumferential ridges. Aperture wide and circular. Ring relatively small, mainly perpendicular to main body, sometimes slightly concave, subcircular to longitudinally elliptical in outline mainly poreless and with a triangular projection at the continuation of the cephalis.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	27	24	27	25
Width of cephalis	40	35	47	41
Length of thorax	13	13	17	14.5
Width of thorax	47	37	55	47
Length of abdomen	13	13	20	16
Width of abdomen	63	47	63	56
Total length of main body	140	133	140	136.5
Maximum width of the main body	70	64	77	69
Maximum diameter of test (transversally)	167	123	167	153.5
Max. width of main body/ Max. diameter of test(transversally)	0.42	0.42	0.54	0.45

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Papiliocampe ovalis* n. gen., n. sp. differs from *P. tokerae* n. gen., n. sp. by having relatively bigger main body and smaller ring.

Papiliocampe tokerae n. gen., n. sp.
Plate 45, figures 6-8

Derivation of Name: This species is named for Prof. Dr. Vedia TOKER, Ankara University, Ankara, Turkey, in honour of her contributions to the knowledge of Planktonic Foraminifera and Nannoplankton biostratigraphy.

Holotype: The specimen on plate 45, figure 6. Sample 97-UKT-138. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: 9 specimens.

Description: Test composed of multicyritid Nassellaria (main body) at the centre and circular to subcircular ring around of it. Main body small, roughly subconical with five post-abdominal segments. Cephalis big, sphaerical and poreless. Collar stricture prominent marked by a deep stricture. The other strictures less prominent only marked by small depressions with one row of circular pores. Subsequent segments, closely spaced, subtrapezoidal in outline, slightly increasing in width while the length of them become approximately constant. Aperture wide and circular. Ring mainly perpendicular to main body, sometimes concave, circular to subcircular in outline mainly poreless and with a triangular projection at the continuation of the cephalis. This projection tapering distally and pointed terminally.

Measurements (μm):

(Based on the 4 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	37	25	37	31
Width of cephalis	40	35	45	40
Length of thorax	13	10	16	13.5
Width of thorax	43	33	55	45
Length of abdomen	13	13	15	14
Width of abdomen	57	57	60	58.5
Total length of main body	140	138	150	144.5
Maximum width of the main body	67	67	70	69
Max. diameter of the test (transversally)	210	210	240	220
Max. width of main body/ Max.diameter of test (transversally)	0.32	0.29	0.33	0.31

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Papiliocampe tokerae* n. gen., n. sp. has been compared to *P. ovalis* n. gen., n. sp. under latter species.

Genus ***Trialatus*** YEH, 1990

Trialatus YEH

YEH, 1990, p. 27

Type species: *Trialatus megacornatus* YEH, 1990.

Trialatus praerobustus SUGIYAMA, 1997

Plate 45, figures 9-12

Trialatus praerobustus SUGIYAMA

SUGIYAMA, 1997, p. 170, figs. 47-1, 2

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Total Range (this study and published): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)- early Norian (*E. abneptis* Con. Z.).

Occurrence: Mino Terrane, Central Japan; Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Trialatus procerus n. sp.

Plate 46, figures 1-4

Derivation of Name: From the Latin *procerus*= slender.

Holotype: The specimen on plate 46, figure 1. Sample 97-UKT-137. Deposited at MTA.

Type Locality: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey (See locality description).

Material: More than 50 specimens.

Description: Test composed of four segments. Cephalis small, hemispherical, perforate with apical horn. Apical horn very stout, triradiate with three massive, wide ridges separated by deep, thin grooves, its width slightly smaller than cephalis, distally long needle-like spine originate from the centre of this triradiate spine, tapering distally, circular in axial section. Collar stricture prominent marked by moderately deep depression. Thorax rather large with circular pores in moderate size; three feet arising from the proximal part of thorax, proximally triradiate

with very wide grooves and thin ridges, then become needle-like (circular in axial section) distally. Abdominal segment hoop-like with big circular pores. Lumbar stricture and stricture between abdominal and post-abdominal segments distinct marked by a deep depressions. Post-abdominal segment vestigial, inverse subtrapezoidal in outline, increasing rapidly in width distally with big circular pores. Distal end of post-abdominal segment smooth without pores.

Measurements (μm):

(Based on the 5 specimens)

	HT	Min.	Max.	Av.
Length of cephalis	25	25	33	27.5
Width of cephalis	50	50	60	54.5
Length of thorax	60	40	60	49
Width of thorax	75	65	80	72
Length of abdomen	30	30	40	34.5
Width of abdomen	85	80	87	83.5
Total length of the test	295	290	305	297
Width of distal end	205	205	235	222
Maximum length of the wings	80	80	115	97.5

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. triangularis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Remarks: *Trialatus procerus* n. sp. differs from *T. praerobustus* SUGIYAMA by having four segments instead of three, longer test and wider distal end.

Nassellaria genus and species indetermined

Nassellaria gen. and sp. indet. A

Plate 46, figures 5-6

Brief definition: Test roughly conical with six to eight post-abdominal segments. Test mainly covered by microgranular silica, mainly dense until six post-abdominal segments. Two rows of pores present between two ridges.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

Nassellaria gen. and sp. indet. B

Plate 46, figures 7-8

Brief definition: Test long with two post-abdominal segments. Cephalothorax smooth, conical with apical horn, abdomen subtrapezoidal and again poreless. Post-abdominal segments globular and successively become bigger distally.

Range (this study): Late Triassic; latest Carnian/earliest Norian (*E. primitia* Con. Z.)-early Norian (*E. abneptis* Con. Z.).

Occurrence: Yaylakuzdere Measured Section, Alakircay Nappe, Antalya Nappes, Kemer, Antalya, Turkey.

6. RESULTS AND CONCLUSIONS

In this study, the biostratigraphy and systematics of late middle to late Triassic Radiolarians are investigated in four measured sections from the Taurus Mountains (the Sugozu and the Yaylakuzdere Measured Sections from the Alakircay Nappe of the Antalya Nappes; the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes and the Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe) and one individual sample from the Ankara Ophiolitic Melange. Furthermore, general stratigraphy of the Antalya Nappes are evaluated and revised based on the individual age determinations of Radiolarians from different parts of this nappe. The results and conclusions of this study can be summarized as follows;

1. The radiolarian fauna obtained from the Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes reveals that the age of the Tirlar Member of the Sapadere Formation (equivalent of the Tesbihli Formation at the west) is late Ladinian- early Carnian.

The radiolarian fauna of the Sugozu Measured Section have close resemblance and well correlative to the zonation proposed by Kozur &

Mostler (1994, 1996b and Personal Communication; Fig. 26A). At the base of the section, *Muelleritortis cochleata* (NAKASEKO & NISHIMURA) is very abundant together with the associated fauna. The characteristic zone fossil (*Pterospongus priscus* KOZUR & MOSTLER) for the basal part of the *Muelleritortis cochleta* Zone could not be found within this level. This level possibly corresponds to the *Pterospongus priscus* Subzone of the *Muelleritortis cochleata* Zone due to location of this level very close to the base of the *S. rarauana* Subzone and the absence of the *Muelleritortis firma* (GORICAN).

Towards the upper part of the section, the *Spongoserrula rarauana* and the *Spongoserrula fluegeli* Subzones of the *Muelleritortis cochleata* Zone are determined, both of these zones are very rich in the species of genus *Muelleritortis* and the species of family Oertlisponginidae.

The radiolarian fauna of the early Carnian *Ttitortis kretaensis* Zone is quite different from the late Ladinian *Muelleritortis cochleata* Zone. Many species of the family Oertlisponginidae and species of genus *Muelleritortis* disappear within this zone while primitive *Palaeosaturnalis* appear very close the base of this zone.

The upper part of the Sugozu Measured Section corresponds to the unnamed zone between *Ttitortis kretaensis* and *Tetraporobrachia haeckeli* Zone (Kozur & Mostler, 1994, 1996b and Personal Communication). This part of the section is characterized by abundant Nassellaria such as *Canoptum cucurbita* (SUGIYAMA), *Corum ? delgado* SUGIYAMA, *Corum sugozuensis* n. sp., *Corum kraineri* n. sp., *Annulotriassocampe baldii* KOZUR Group, *Annulotriassocampe sulovensis* (KOZUR & MOCK) and some Spumellaria such as *Spongostylus tortilis* KOZUR & MOSTLER, *Vinassaspongus subsphaericus* KOZUR & MOSTLER, *Karnospongella bispinosa* KOZUR & MOSTLER.*Palaeosaturnalis* spp.,*Orbiculiforma goestlingensis* (KOZUR & MOSTLER) and *Muelleritortis cive* SUGIYAMA.

2. Conodont and radiolarian fauna of the Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe reveals that the age of the Huglu Tuffites is middle Carnian but not Anisian-Ladinian mentioned in previous studies (Monod, 1977; Gokdeniz, 1981; Ozgul, 1997).

Moderately preserved but diverse radiolarian fauna from the limestone intercalations in the tuffs-tuffites-basic volcanics from the Haciyunuslar Measured Section is very similar and well correlative to radiolarian fauna from Gostling and Grossreifling in Austria (Kozur & Mostler, 1972, 1978, 1979, 1981). The radiolarian assemblages of the limestones indicate *Tetraporobrachia haeckeli* Zone established by Kozur & Mostler (1994) due to presence of index-species and associated fauna.

3. Very abundant mainly pyritized Radiolarians obtained from the Gokdere Formation (mainly an alternation of thin limestones and shales at the base and cherty limestone at the top) in the Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes indicate latest Carnian- early Norian age.

Three conodont zones are determined within the Gokdere Formation, namely the *Epigondolella primitia* (latest Carnian-earliest Norian), the *Epigondolella abneptis* (early Norian) and the *Epigondolella triangularis* Zones (upper part of early Norian).

The radiolarian assemblages of the *Epigondolella primitia* Conodont Zone is characterized by the dominance of the species of genus *Capnodoce* DE WEVER especially *Capnodoce media* BLOME and *Capnodoce extenta* BLOME.

The radiolarian fauna of the *Epigondolella abneptis* Conodont Zone is very rich. Many radiolarian taxa are only restricted within this conodont zone, some of the characteristic new forms are *Kahlerosphaera kemerensis adentatus* n. sp., n. subsp., *Kahlerosphaera kemerensis kemerensis* n. sp., n. subsp., *Dicapnuchosphaera elegans* n. gen., n. sp., *Dicapnuchosphaera sengori* n. gen., n. sp., *Paricrioma deweveri* n. gen., n. sp., *Bulbocyritium globosus* n. sp., *Xiphotheca ? transitus* n. sp.,

Monocapnuchosphaera subtornata dextra n. gen., n. sp., n. subsp., *Sarla robusta* n. sp., *Deflandrecyrtium tegumentiformis* n. sp., *Podobursa galeata* n. sp., *Senelella triassica* n. gen., n. sp, *Xiphotheca pseudolonga* n. sp. and *Tauridastrum longitubus* n. gen., n. sp.

The radiolarian fauna of the *Epigondolella triangularis* Conodont Zone in many cases have differences from those of the *Epigondolella abneptis* Conodont Zone. Two characteristic radiolarian taxa of this conodont zone, *Capnodoce serisa* DE WEVER and *Stauroacanthocircus ? poetschensis* KOZUR & MOSTLER, for the first time appear very close the top of the *Epigondolella abneptis* Conodont Zone and become very abundant in the *Epigondolella triangularis* Conodont Zone. The upper part of the *Epigondolella triangularis* Conodont Zone is especially very rich in Satunalid fauna. *Xiphosphaera fistulata* CARTER and *Kahlerosphaera norica* KOZUR & MOCK with short primary spines are also important indicators of the upper part of the *Epigondolella triangularis* Conodont Zone. Therefore, informal association of Radiolarians could be named as "*Capnodoce serisa-Xiphosphaera fistulata- Kahlerosphaera norica* with short arms" for the upper part of the *Epigondolella triangularis* Conodont Zone (upper part of early Norian).

Since the Karadere Formation (ocean floor basalts) is overlain by the Gokdere Formation in the Yaylakuzdere Measured Section and one of the limestone layer in the pillow lava yielded Scythian-middle Carnian conodonts, the age of the Karadere Formation is older than latest Carnian, at least middle Carnian-late Carnian.

4. Age determinations using radiolarian data from various blocks of the Ankara Ophiolitic Melange reveal that the blocks range in age from late Norian to late Albian-Turonian. Only middle Jurassic blocks have not yet been found.

Radiolarian assemblages of the late Norian block from the Ankara Ophiolitic Melange clearly indicate the *Betraccium deweveri* Subzone of the *Betraccium* Zone proposed by Blome (1984) due to presence of index-species.

Further investigation of the Ankara Ophiolitic Melange may give additional clues to its origin. The Senonian Ophiolitic Melange is exposed widely throughout the Ankara-Erzincan Suture Zone and is supposed to be remnant of the subduction complex accreted at the south facing active margin of the northern branch of Neo-Tethys during late Cretaceous (Sengor & Yilmaz, 1981). It should be noted that Triassic and early Jurassic radiolarian cherts were previously unknown in this unit. These blocks can represent oceanic basin deposits of Paleotethys which were incorporated into the subduction/accretion prism during the closure of Neotethys. An alternative model would imply that the Neo-Tethys has been opened already during middle Triassic as suggested by Goncuoglu et al. (1992) and sea-floor spreading continued until Cretaceous. If this is the case, the model of Sengor & Yilmaz (1981) for the Mesozoic history of this part of the Tethys should be revised. For further investigations, it will be necessary to find evidence of continous successions in the larger blocks.

5. Moderately preserved but diverse Rhaetian Radiolarians from red chert beds of the Kayabuku Formation in the Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes clearly reveals that pelagic sediments occur first time in Rhaetian in this nappe. The basal part of the early Jurasic in the Kayabuku Formation contains also Radiolaria bearing pelagic sediments similar to those of Rhaetian part.

Radiolarian fauna of the Rhaetian part of the Kayabuku Formation exhibits close resemblance and is well correlative to those of the fauna from the Queen Charlotte Island studied by Carter (1993). The radiolarian fauna from the base of the Kayabuku Formation correspond to 2b and 2c assemblages proposed by Carter (1993) while the fauna of the upper part of Rhaetian from the Kayabuku Formation could correspond to Assemblage 3 proposed by Carter (1993).

It is very important to note that many forms disappear at the Rhaetian-Hettengian boundary in the Dikmetas Measured Section. The radiolarian fauna of the early Jurassic part of the Kayabuku Formation in the Dikmetas Measured

Section is represented by *Parahsuum simplum* YAO and associated fauna which are very characteristic for this time interval.

6. In this study, 284 species, subspecies and 48 taxa belonging to open nomenclature are investigated. 70 species and 5 subspecies are described as new. These taxa belong to 115 genera (14 of them are new, namely *Dicapnuchosphaera, Monocapnuchosphaera, Nodocapnuchosphaera, Paricrioma, Braginastrum, Pseudogodia, Tauridastrum, Tricornicyrtium, Alatipicapora, Kozuricyrtium Praeprotunuma, Senelella, Mostlericyrtium, Papiliocampe*) and 41 family. A comprehensive list of determined taxa is submitted.

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PLATES

PLATE 1

Scanning electron micrographs of **Spumellaria**-Family **Actinommidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Carinaheliosoma carinata*** (KOZUR & MOSTLER)

1. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200,
2. Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 3-4 ***Kahlerosphaera ? aspinosa*** KOZUR & MOCK

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

3. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 5-6 ***Kahlerosphaera kemerensis adentatus*** n. sp., n. subsp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

5. Holotype, sample No. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 100,
6. Paratype, sample No. 96-UKT-662, early Norian (*E. abneptis* Con. Z.), Py., x 100.

Figures 7-9 ***Kahlerosphaera kemerensis kemerensis*** n. sp., n. subsp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

7. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
8. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
9. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 10 ***Kahlerosphaera longispinosa*** KOZUR & MOSTLER

Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figures 11-12 ***Kahlerosphaera norica*** KOZUR & MOCK Group

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

11. Specimen with long primary spines, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
12. Specimen with short and thick primary spines, sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 100.

PLATE 1

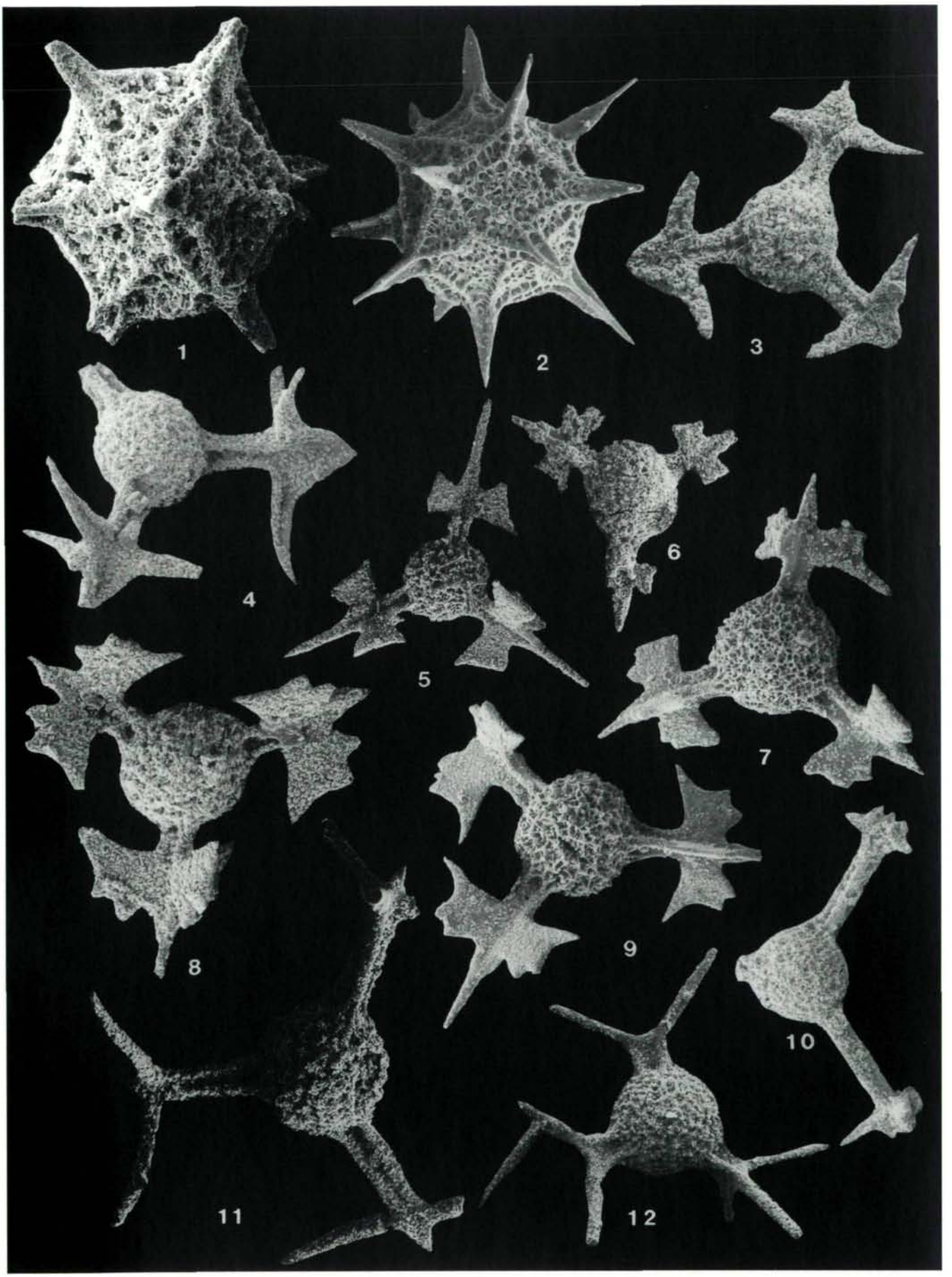

PLATE 2

Scanning electron micrographs of **Spumellaria**-Family **Stylosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Dumitricasphaera simplex*** n. sp.

Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe,

1. Holotype, sample no. 96-UKT-707, middle Carnian, x 100,
2. Paratype, sample no. 96-UKT-707, middle Carnian, x 150.

Figures 3-4 ***Dumitricasphaera* sp. A**

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

3. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 350,
4. Sample no. 96-UKT-526, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figures 5-6 ***Spongostylus carnicus*** KOZUR & MOSTLER

5. Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150,
6. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figures 7-8 ***Spongostylus tortilis*** KOZUR & MOSTLER

7. Sample no. 96-UKT-531, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150,
8. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figures 9-10 ***Vinassaspongus erendili*** n. sp.

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

9. Holotype, sample no. 96-UKT-551, early Carnian (Base of the *T. kretaensis* Rad. Z.), x 200,
10. Paratype, sample no. 96-UKT-550, early Carnian (Base of the *T. kretaensis* Rad. Z.), x 200.

Figures 11-12 ***Vinassaspongus subsphaericus*** KOZUR & MOSTLER

11. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200,
12. Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 13 ***Zhamojdasphaera latispinosa*** KOZUR & MOSTLER

Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran-Nappe, middle Carnian, x 200.

PLATE 2

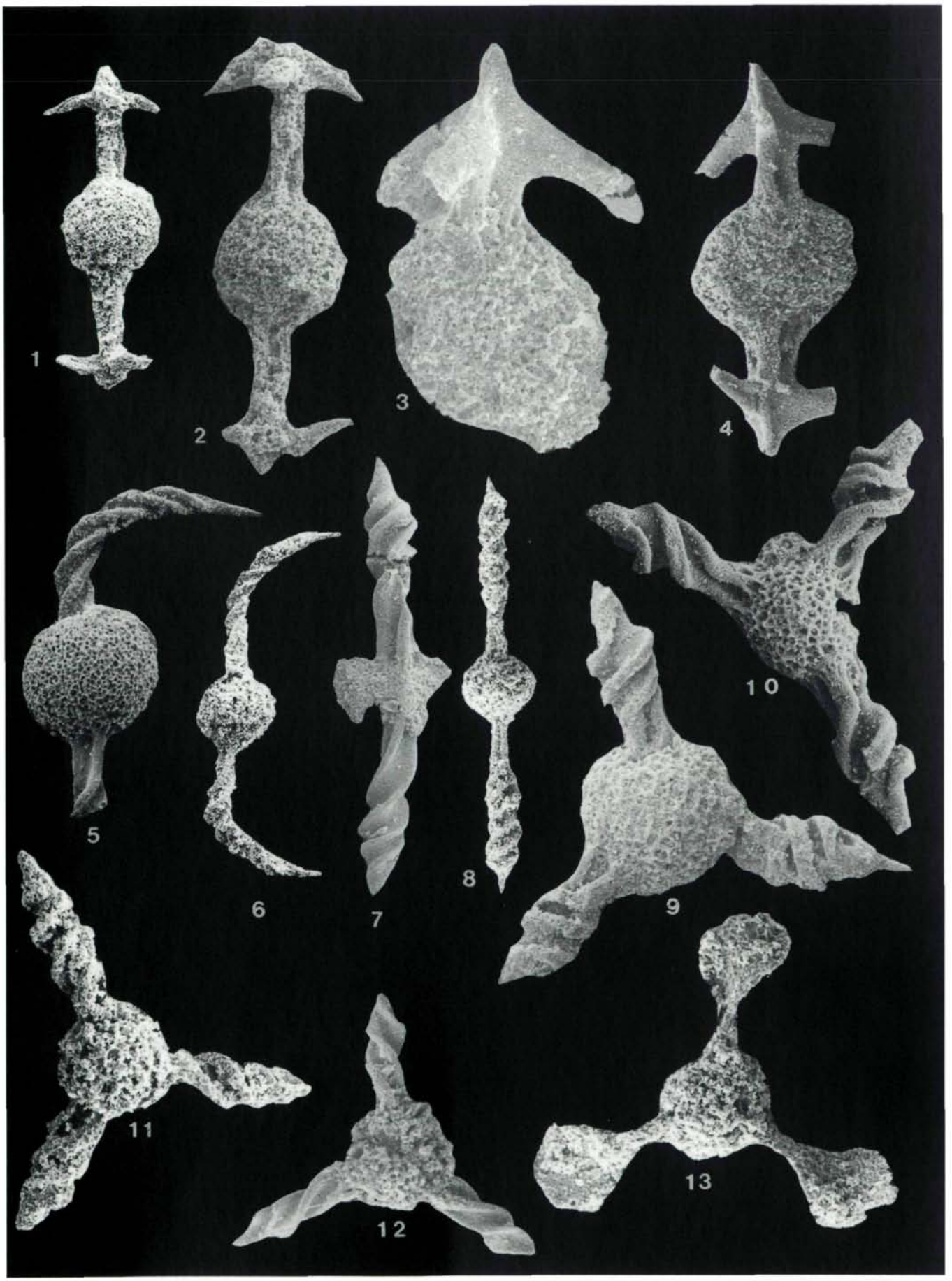

PLATE 3

Scanning electron micrographs of **Spumellaria**-Family **Triposphaeridae** and **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Fontinella habros*** CARTER
Sample no. 98-UKT-13, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 2 ***Fontinella inflata*** CARTER
Sample no. 98-UKT-16, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 3 ***Fontinella* sp. aff. *F. louisensis*** CARTER
Sample no. 98-UKT-15, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 4-5 ***Capnuchosphaera colemani*** BLOME Group
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Specimen with one of the tumidispinae is pathalogic, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 6-7 ***Capnuchosphaera concava*** DE WEVER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
7. Sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 8-9 ***Capnuchosphaera constricta*** (KOZUR & MOCK)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Specimen with one of the tumidispinae is pathalogic, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
9. Sample no. 98-UKT-68, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 10-11 ***Capnuchosphaera crassa*** YEH
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Sample no. 97-UKT-123, early Norian (*E. abneptis* Con. Z.), Py., x 200,
11. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 12-13 ***Capnuchosphaera deweveri*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
12. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 100,
13. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 14 ***Capnuchosphaera lea*** DE WEVER
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

PLATE 3

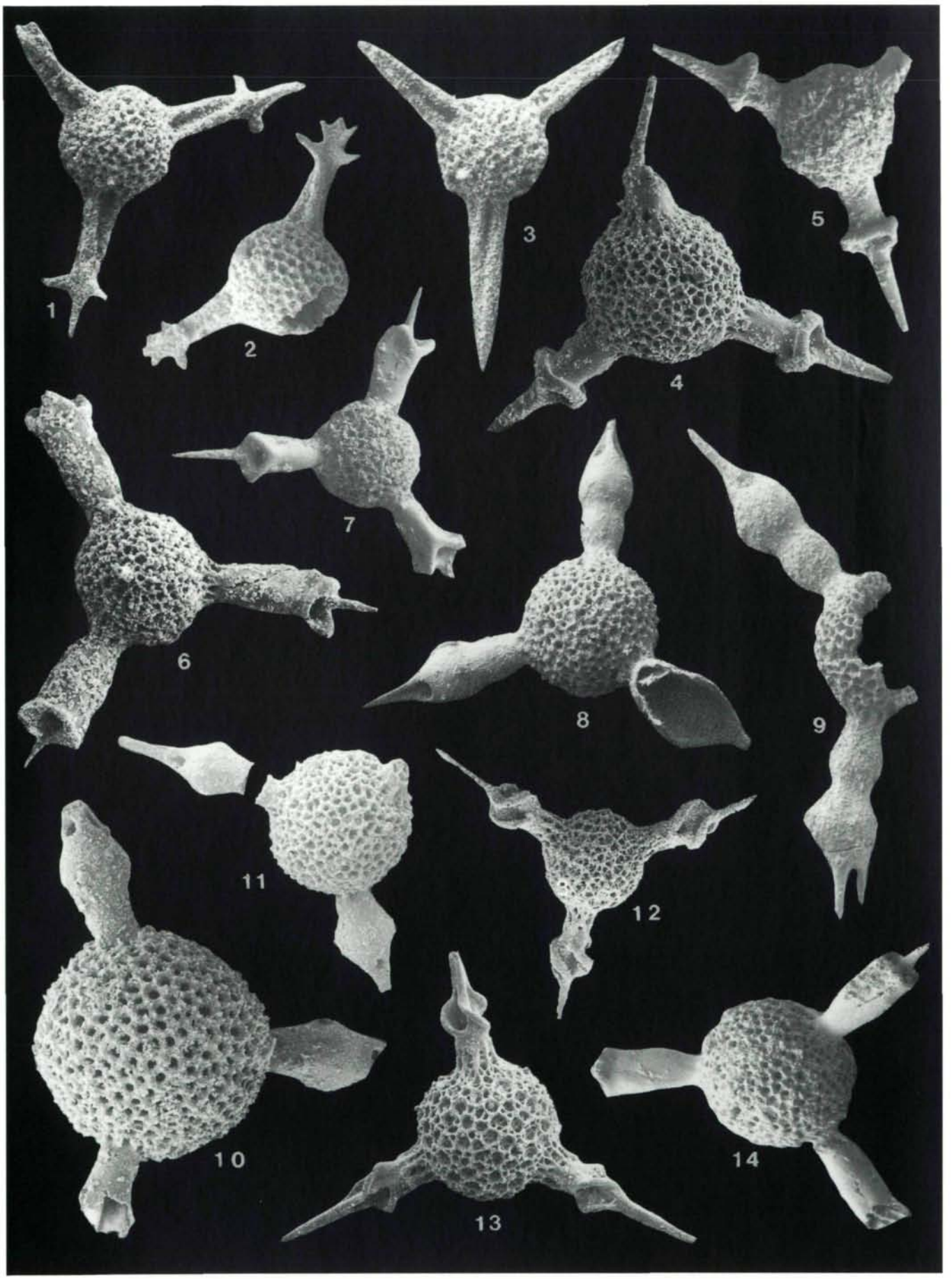

PLATE 4

Scanning electron micrographs of **Spumellaria**-Family **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Capnuchosphaera lenticulata*** PESSAGNO
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 2 ***Capnuchosphaera silviesensis*** BLOME Group
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), x 100.

Figure 3 ***Capnuchosphaera theloides*** DE WEVER
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py, x 150.

Figures 4-5 ***Capnuchosphaera triassica*** DE WEVER
Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe,
4. Sample no. 96-UKT-707, middle Carnian, x 100,
5. Sample no. 96-UKT-707, middle Carnian, x 100.

Figures 6-7 ***Capnuchosphaera tricornis*** DE WEVER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 8 ***Capnuchosphaera* sp. A**
Sample no. 96-UKT-672, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 240.

Figure 9 ***Capnuchosphaera* sp. B**
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 10-13 ***Dicapnuchosphaera carterae*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Holotype, sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150,
11. Paratype, broken tumidispina showing the detail of inner structure, sample no. 97 UKT-123, early Norian (*E. abneptis* Con. Z.), Py., x 200,
12. Detail photographs showing the double layered cortical shell, same as fig. 10, x 500,
13. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 4

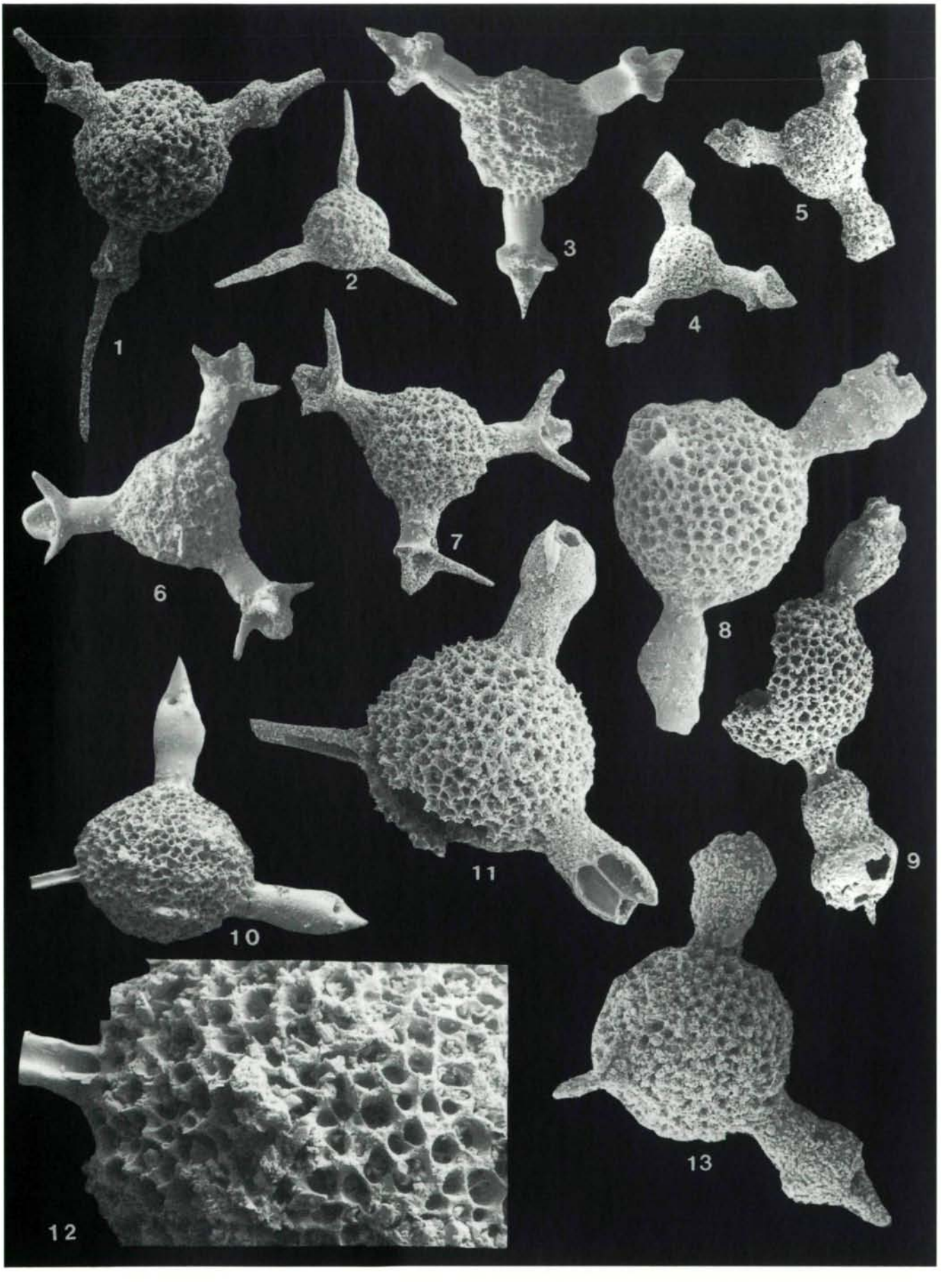

PLATE 5

Scanning electron micrographs of **Spumellaria**-Family **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Dicapnuchosphaera elegans*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
2. Paratype, sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 3-6 ***Dicapnuchosphaera sengori*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
3. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
4. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
6. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 7 ***Dicapnuchosphaera* sp. A**
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 8-9 ***Monocapnuchosphaera gracilis*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150.
9. Paratype, size of the cortical shell slightly smaller due to bad preservation, sample no. 96 UKT-676, early Norian (*E. triangularis* Con. Z.), x 150,

Figures 10-11 ***Monocapnuchosphaera inflata*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Holotype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 150,
11. Paratype, specimen with two broken triradiate primary spines, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 200,

Figures 12-15 ***Monocapnuchosphaera longispina*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
12. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
13. Detail of cortical shell, same as fig. 12, x 500,
14. Paratype, specimen with two broken triradiate primary spines, sample no. 98-UKT- 61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
15. Paratype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150.

PLATE 5

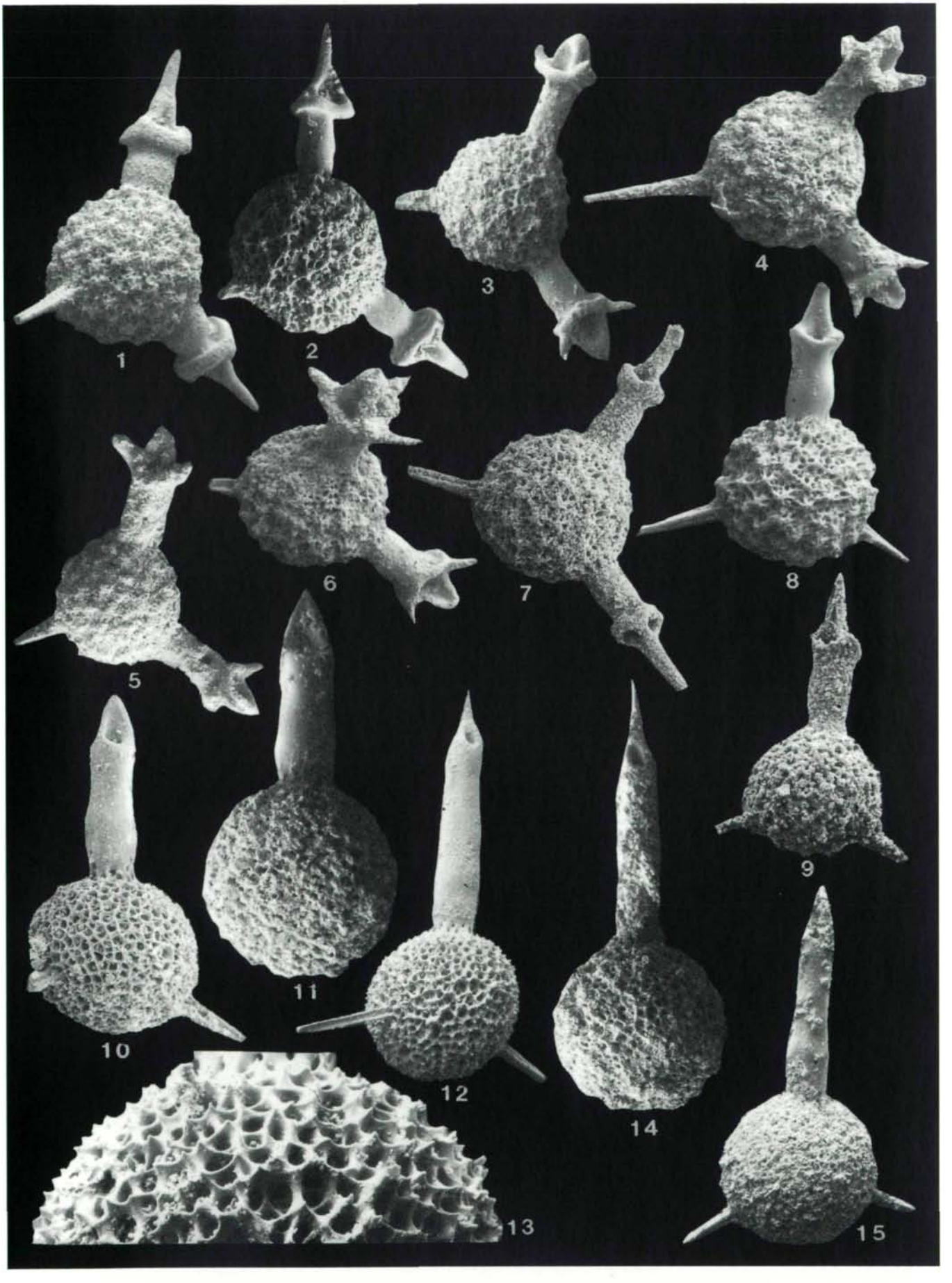

PLATE 6

Scanning electron micrographs of **Spumellaria**-Family **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3 ***Monocapnuchosphaera subtornata dextra*** n. gen., n. sp., n. subsp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
2. Paratype, specimen with two broken triradiate primary spines, sample no. 97-UKT-137, x 150,
3. Paratype, note the additonal spine on the cortical shell, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,

Figures 4-5 ***Monocapnuchosphaera subtornata sinistra*** n. gen., n. sp., n. subsp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,

Figures 6-7 ***Monocapnuchosphaera tornata*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Holotype, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Paratype, specimen with two broken triradiate primary spines, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 8 ***Monocapnuchosphaera* sp. B**
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), x 200.

Figure 9 ***Monocapnuchosphaera* sp. A**
Sample no. 98-UKT-59, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 10-14 ***Nodocapnuchosphaera tuzcuae*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
11. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
12. Detail of tumidispina and cortical shell, same as fig. 10, x 150,
13. Paratype, sample no. 97-UKT-123, early Norian (*E. abneptis* Con. Z.), Py., x 150,
14. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150.

PLATE 6

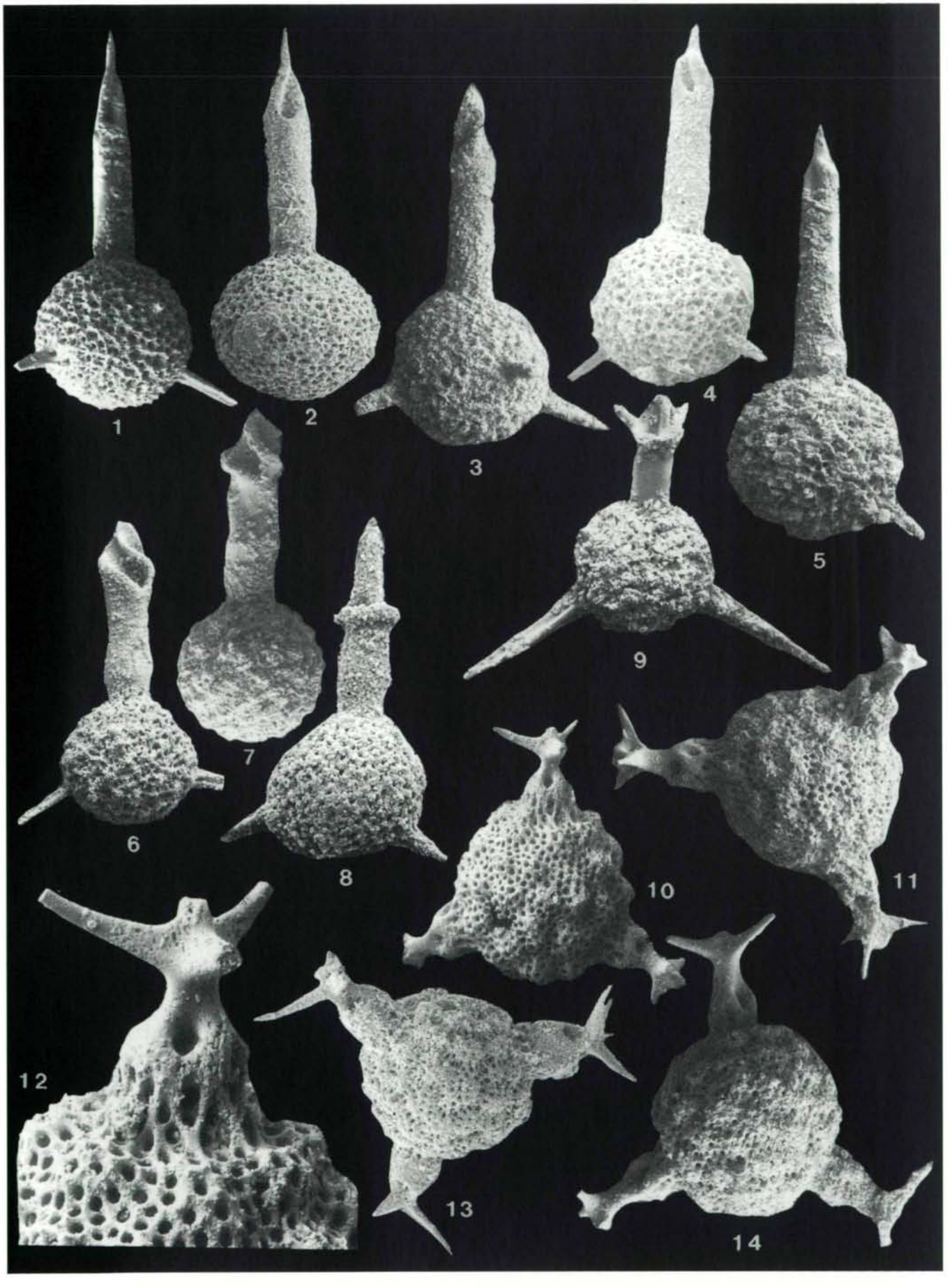

PLATE 7

Scanning electron micrographs of **Spumellaria**-Family **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Catoma* sp. A**
Sample no. 97-UKT-133, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figure 2 ***Catoma* sp. B**
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 3 ***Divatella austriaca*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figures 4, 7 ***Icrioma cruciformis*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
7. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 5-6 ***Icrioma tetrancistrum*** DE WEVER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
5. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
6. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 8 ***Icrioma* sp. A**
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 9-10 ***Paricrioma deweveri*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,.
9. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
10. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 11 ***Paricrioma* sp. aff. *P. deweveri*** n. gen., n. sp.
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 12 ***Paricrioma cistella*** (CARTER) n. comb.
Sample no. 98-UKT-19, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 13 ***Weverella tetrabrachiata aspinosa*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

PLATE 7

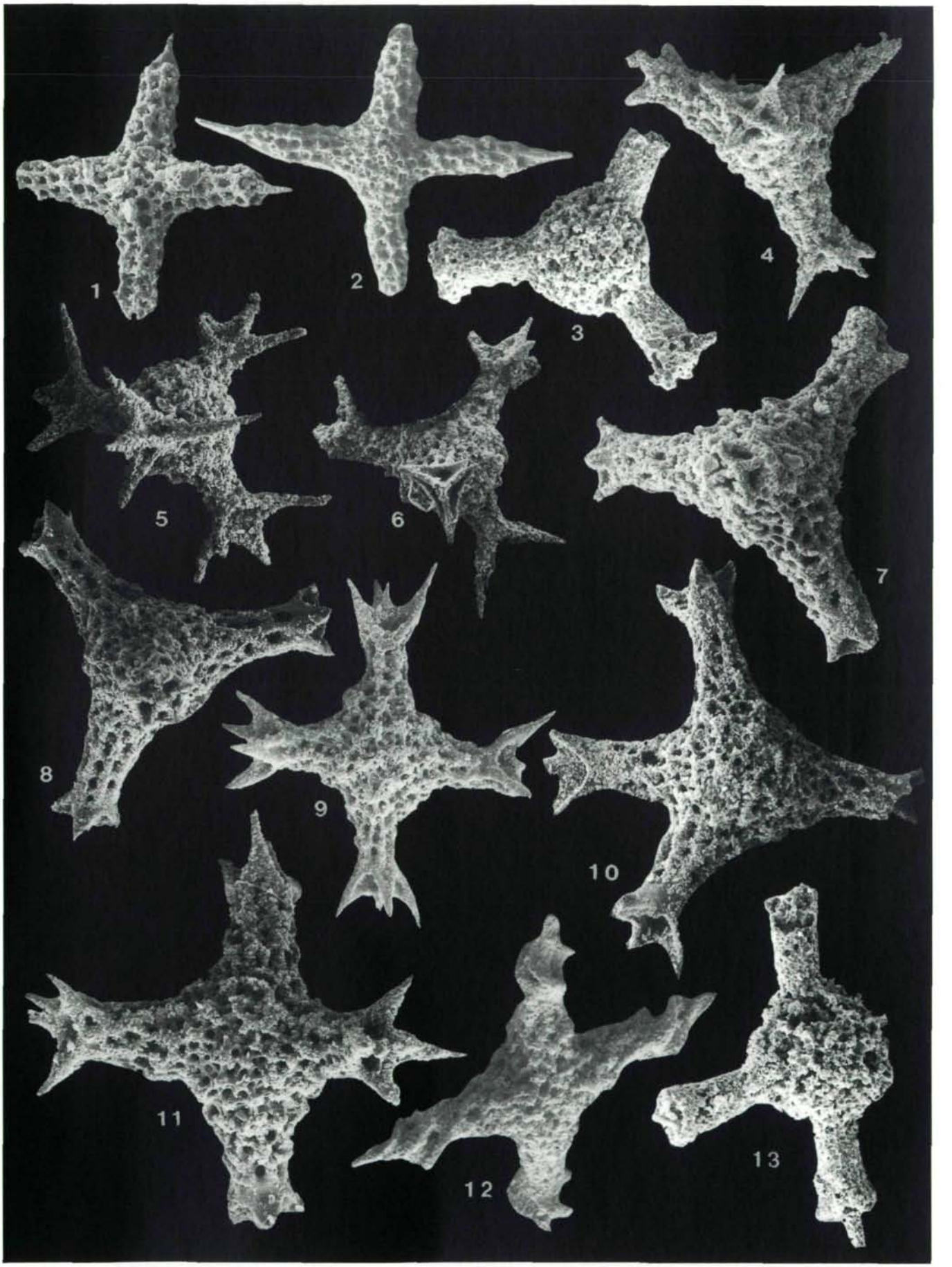

PLATE 8

Scanning electron micrographs of **Spumellaria**-Family **Capnuchosphaeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-5, 7 ***Braginastrum curvatus*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
2. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200,
3. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Paratype, detail of cortical shell, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 400,
7. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 6, 10 ***Sarla dumitricai*** (LAHM) n. comb.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

6. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
10. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 8-9 ***Sarla robusta*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

8. Holotype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
9. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 11-12 ***Sarla transita*** (KOZUR & MOCK)

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

11. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
12. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 13 ***Sarla vetusta*** PESSAGNO

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 14 ***Sarla vizcainoensis*** PESSAGNO

Sample no. 98-UKT-59, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

PLATE 8

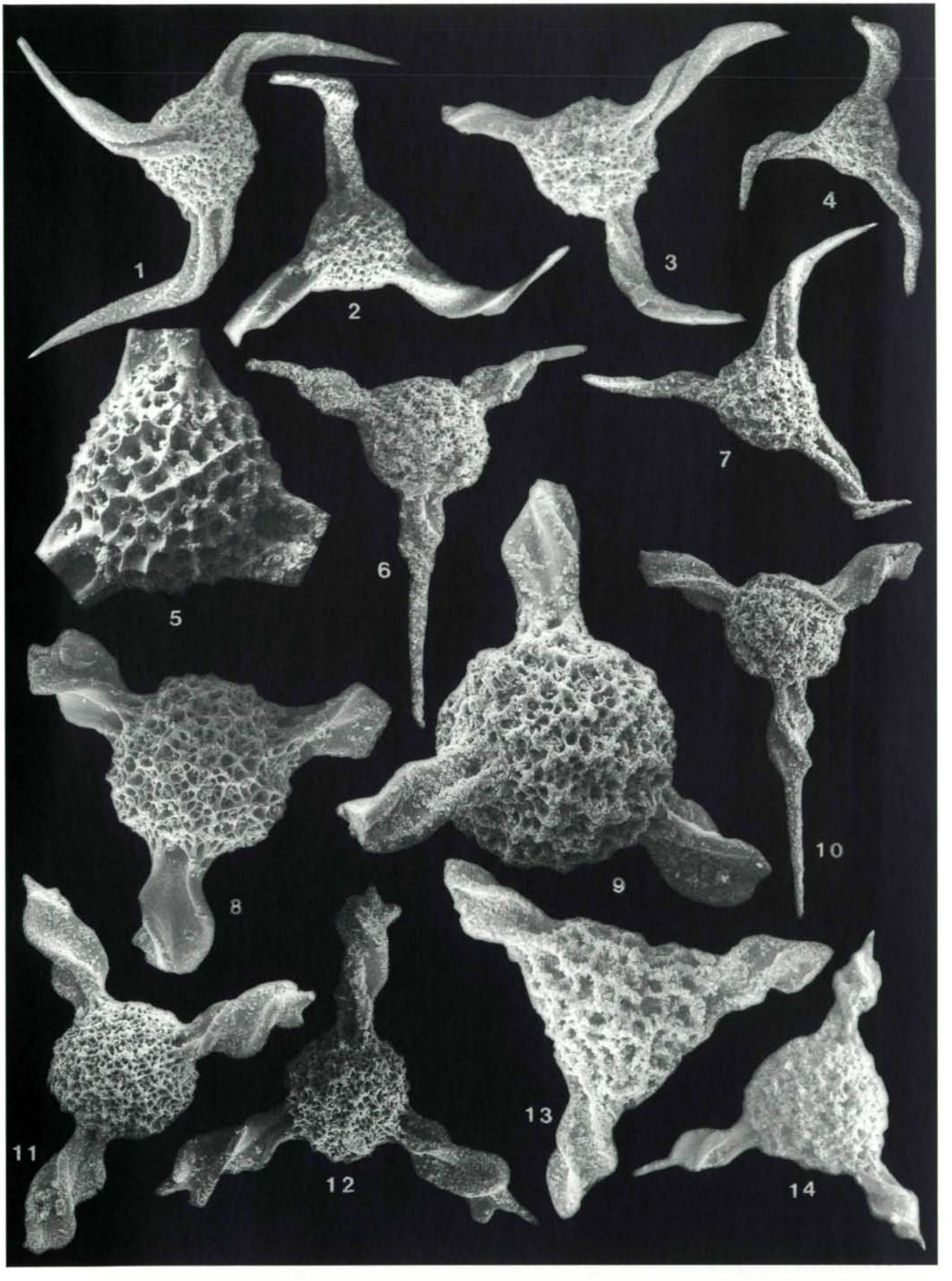

PLATE 9

Scanning electron micrographs of **Spumellaria**-Family **Patulibrachiidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1-2 ***Bistarkum* sp. aff. *B. ? cylindratum*** CARTER

1. Sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150,
2. Detail of tip, same as fig. 1, x 500.

Figures 3-4 ***Crucella tenuis*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

3. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 5 ***Triassocrucella baloghi*** (KOZUR & MOSTLER)

Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 6 ***Triassocrucella triassica*** (KOZUR & MOSTLER)

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 7 ***Paronaella claviformis*** (KOZUR & MOSTLER) n. comb.

Sample no. 96-UKT-549, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150.

Figure 8 ***Paronaella fragilis*** (KOZUR & MOSTLER)

Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figures 9, 11 ***Paronaella norica*** KOZUR & MOCK

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

9. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150,
11. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 180.

Figure 10 ***Paronaella glaber*** (KOZUR & MOSTLER) n. comb.

Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 75.

PLATE 9

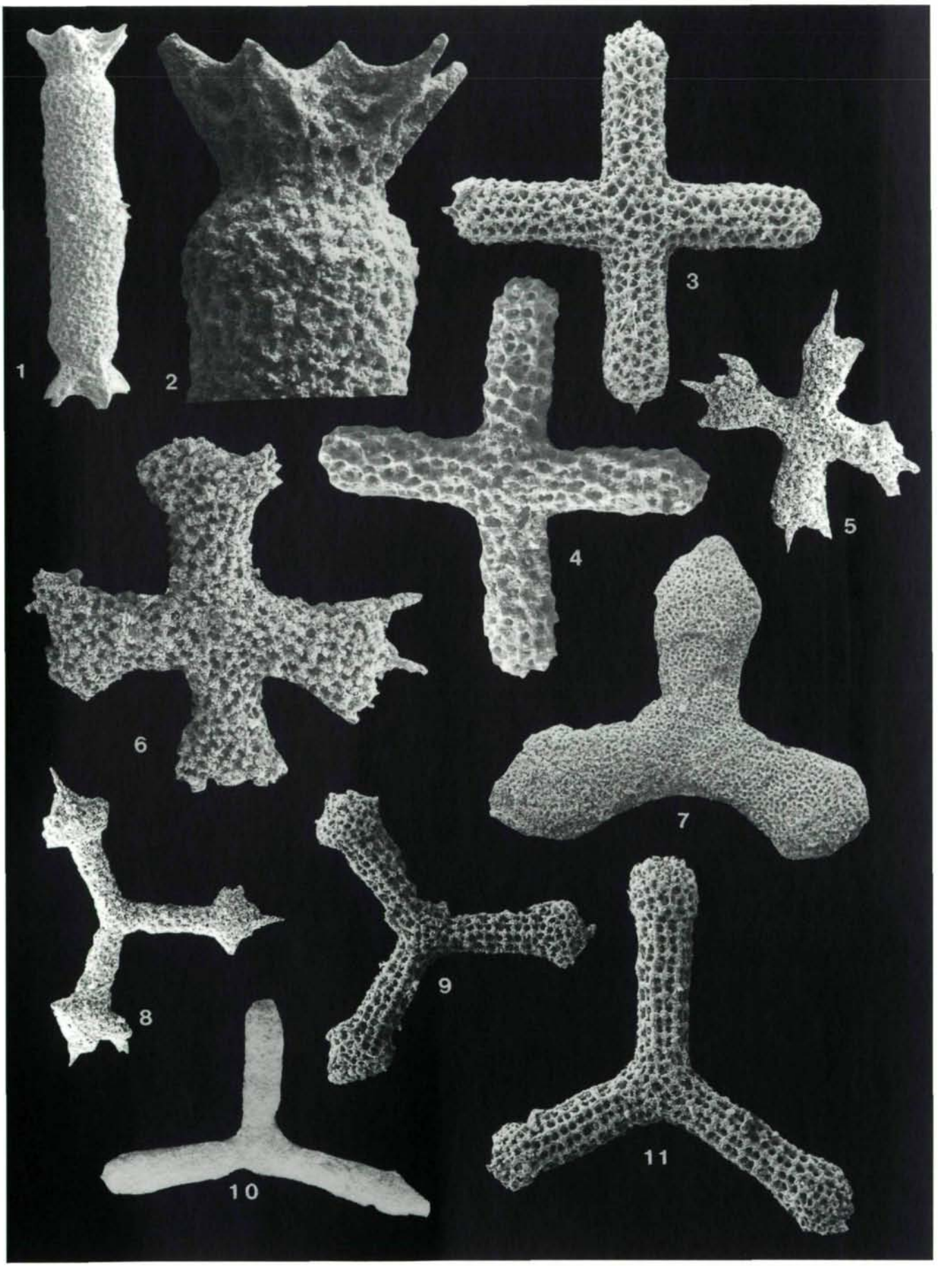

PLATE 10

Scanning electron micrographs of **Spumellaria**-Family **Patulibrachiidae** and **Paratriassoastridae** from Taurus Mountains. Py: Pyritized Radiolaria.

Figure 1 ***Paronaella* sp. aff. *P. nudum*** (KOZUR & MOSTLER) n. comb.
Sample no. 96-UKT-544, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 2 ***Paronaella pacofiensis*** CARTER
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 100.

Figure 3 ***Paronaella reiflingensis*** (KOZUR & MOSTLER)
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 4 ***Paronaella trammeri*** (KOZUR & MOSTLER)
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 5 ***Paronaella* sp. aff. *P. yaogusensis*** CARTER
Sample no. 98-UKT-16, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150.

Figure 6 ***Paronaella* sp. A**
Sample no. 98-UKT-18, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150.

Figure 7 ***Natraglia unica*** PESSAGNO
Sample no. 98-UKT-59, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 8 ***Paratriassoastrum cordevolicum*** KOZUR & MOSTLER
Sample no. 97-UKT-123, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 9 ***Paratriassoastrum* sp. A**
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150.

Figures 10-11 ***Paratriassoastrum omegaense*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
10. Sample no. 98-UKT-16, Rhaetian, x 200.
11. Sample no. 98-UKT-14, Rhaetian, x 200.

Figure 12 ***Paratriassoastrum* sp. B**
Sample no. 98-UKT-9, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

PLATE 10

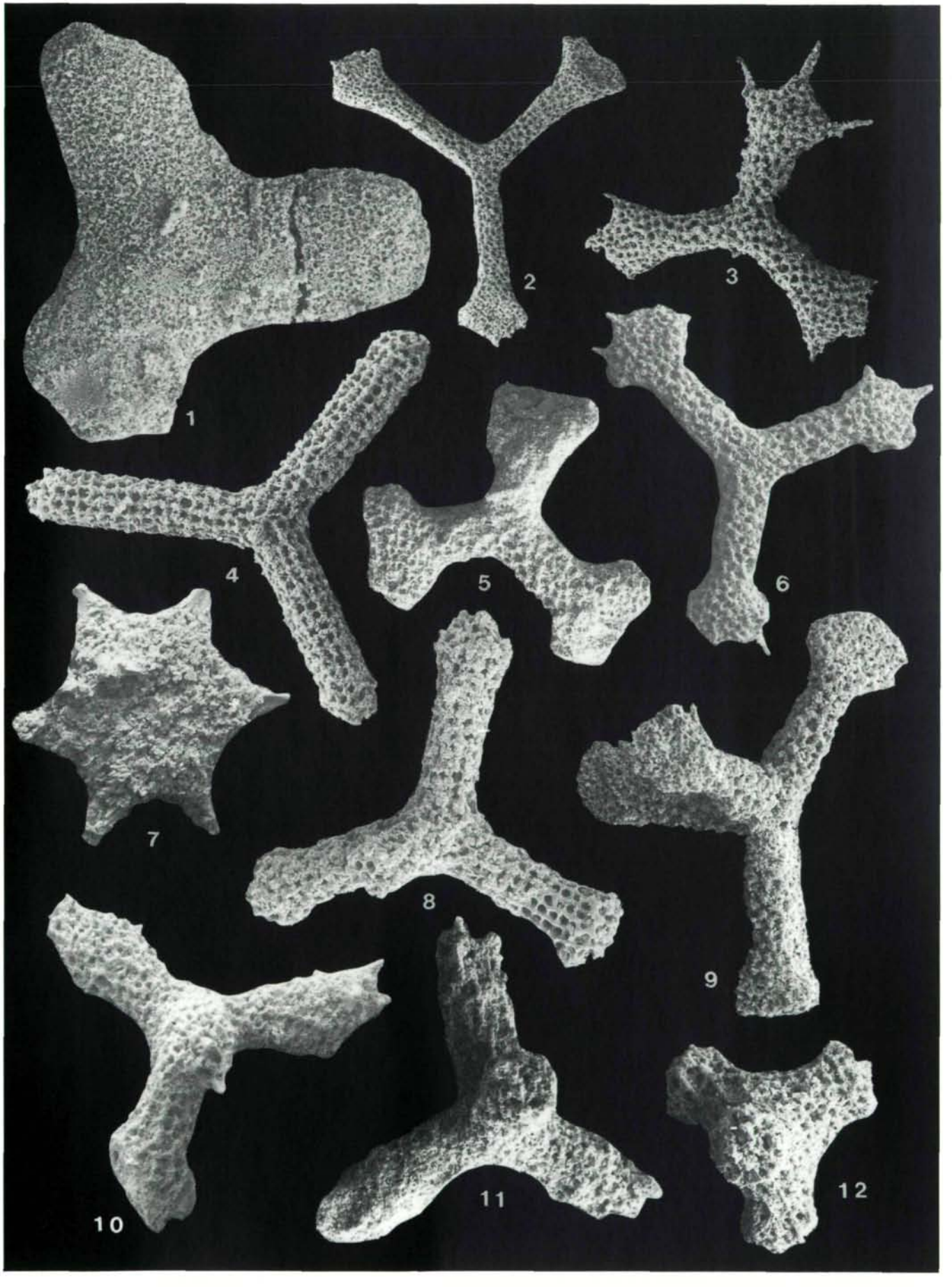

PLATE 11

Scanning electron micrographs of **Spumellaria**-Family **Pantanellidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Capnodoce anapates*** DE WEVER
Sample no. 96-UKT-672, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 2-3 ***Capnodoce crystallina*** PESSAGNO Group
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
2. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 200,
3. Sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 4-5 ***Capnodoce extenta*** BLOME Group
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Sample no. 98-UKT-41, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figures 6-9 ***Capnodoce longibrachium*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Holotype, Sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Paratype, Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
8. Paratype, Sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 200,
9. Paratype, Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 10 ***Capnodoce media*** BLOME
Sample no. 98-UKT-41, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figure 11 ***Capnodoce* sp. cf. *C. minuta*** YEH
Sample no. 97-UKT-120, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figures 12-13 ***Capnodoce serisa*** DE WEVER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
12. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 150,
13. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 100.

Figures 14-15 **Pathologic *Capnodoce* sp.**
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, both two specimens have different extension from tumidispinae as fourth spine,
14. Sample no. 98-UKT-41, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200,
15. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 250.

PLATE 11

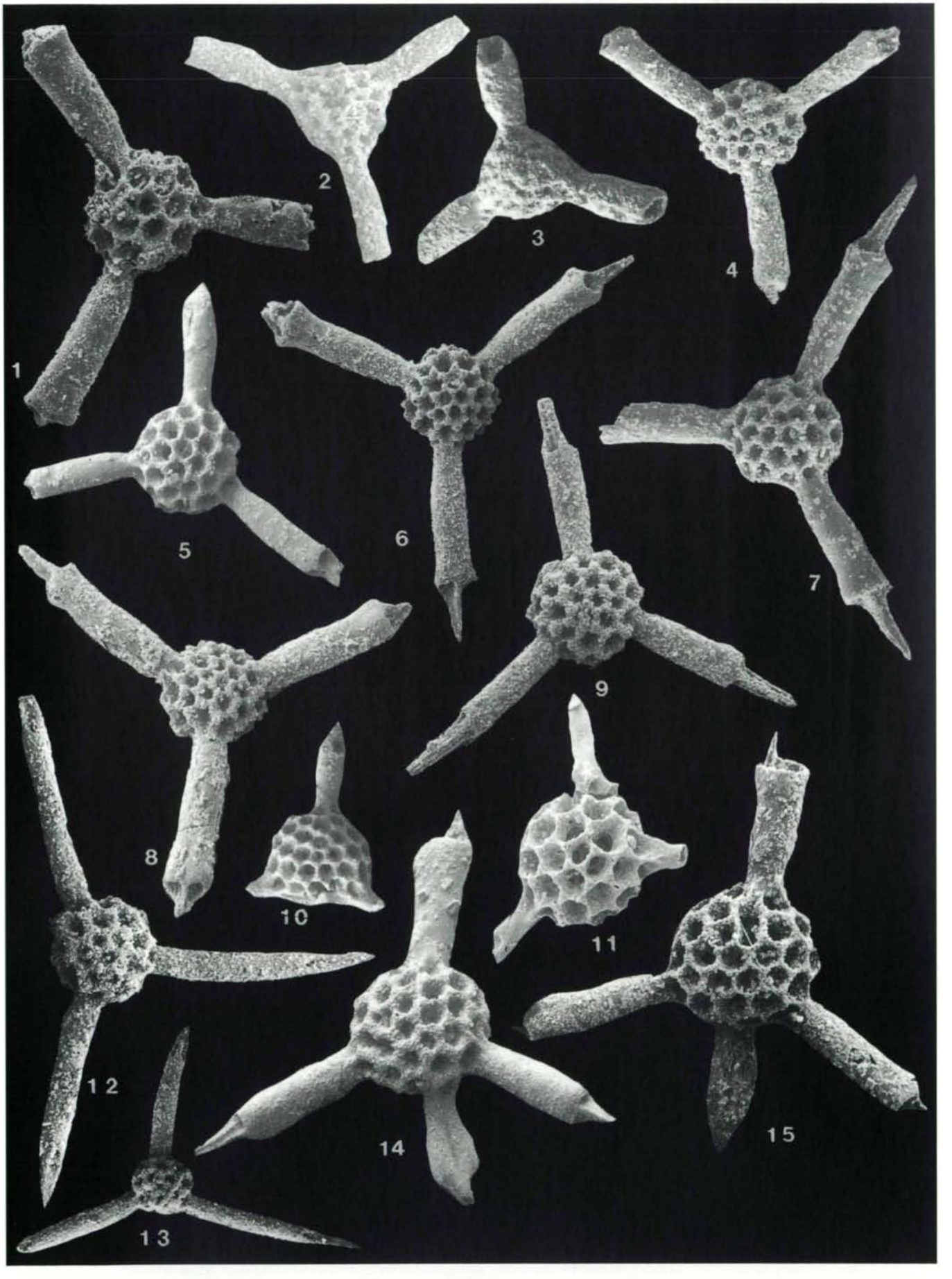

PLATE 12

Scanning electron micrographs of **Spumellaria**-Family **Pantanellidae** from Taurus Mountains and Ankara region. Py.: Pyritized Radiolaria.

Figure 1 ***Loffa mulleri*** PESSAGNO
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 2-3 ***Loffa vesterensis*** BLOME
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
2. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
3. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 4 ***Loffa* sp. A**
Sample no. 97-UKT-123, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 5 ***Renzium adversum*** BLOME
Sample no. 98-UKT-68, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 6-7 ***Renzium tricarinatum*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Holotype, Sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Paratype, Sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 8 ***Renzium* sp. A**
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 250.

Figure 9 ***Renzium* sp. B**
Sample no. 98-UKT-65, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 10 ***Renzium* sp. C**
Sample no. 98-UKT-66, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 11-12 ***Betraccium deweveri*** PESSAGNO & BLOME
Ankara Ophiolitic Melange, Ankara,
11. Sample no. 94-B-1-7, late Norian, x 300,
12. Sample no. 94-B-1-7, late Norian, x 300.

Figure 13 ***Betraccium inornatum*** BLOME
Sample no. 98-UKT-13, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 300.

Figures 14-15 ***Betraccium perilense*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
14. Sample no. 98-UKT-17, Rhaetian, x 200,
15. Sample no. 98-UKT-16, Rhaetian, x 200.

PLATE 12

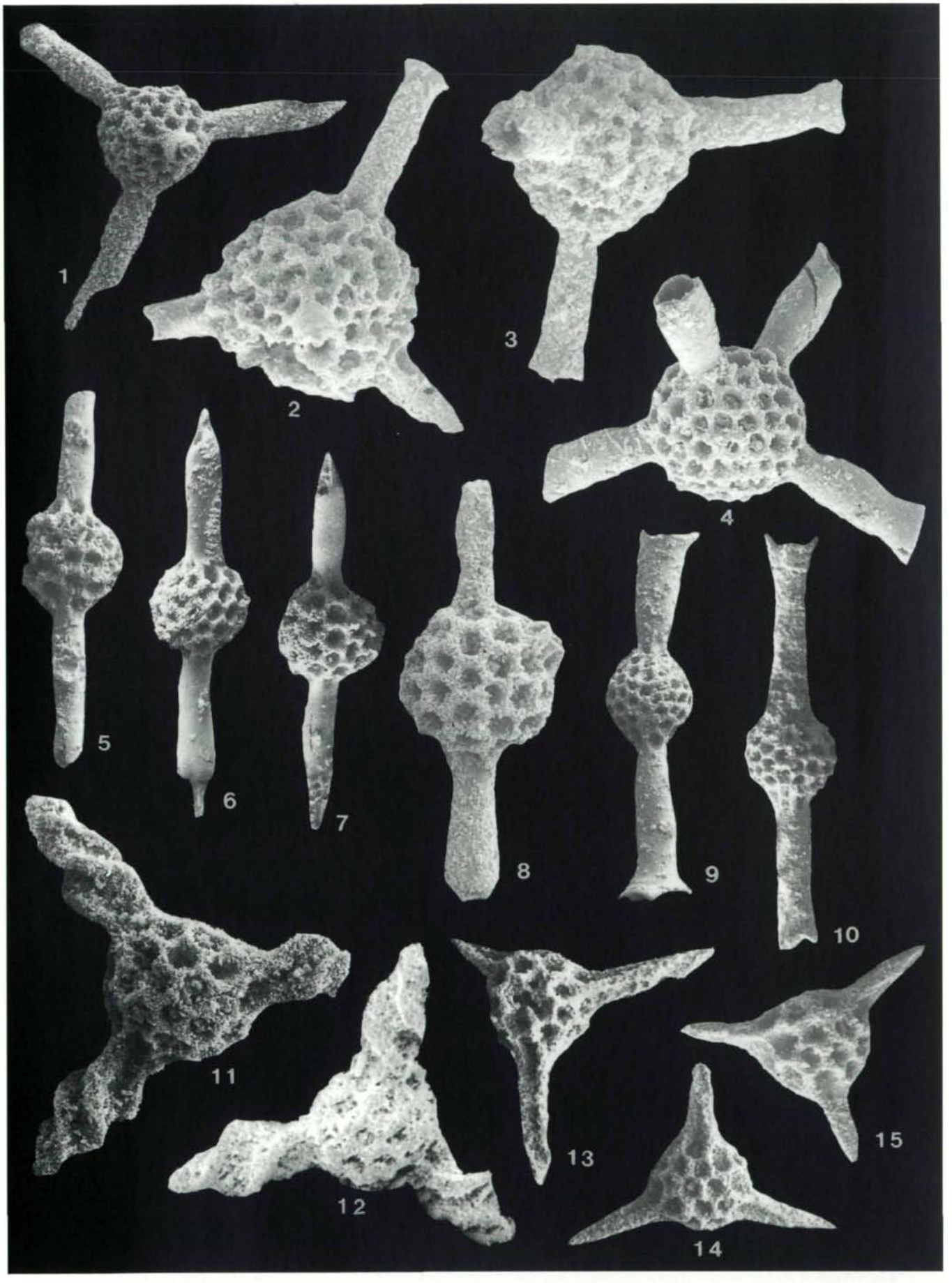

PLATE 13

Scanning electron micrographs of **Spumellaria**-Family **Pantanellidae** and **Ferresidae** from Taurus Mountains and Ankara region. Py.: Pyritized Radiolaria.

Figure 1 ***Betraccium* sp. A**
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 2 ***Betraccium* sp. B**
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 3 ***Cantalum alium*** BLOME
Sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 300.

Figure 4 ***Cantalum* sp. A**
Sample no. 98-UKT-16, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 5 ***Gorgansium thayeri*** YEH
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 6 ***Gorgansium* sp. A**
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 7 ***Gorgansium* sp. B**
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 8 ***Gorgansium* sp. C**
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 9 ***Pantanellium dawsoni*** PESSAGNO & BLOME
Sample no. 98-UKT-51, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 400.

Figure 10 ***Pantanellium inornatum*** PESSAGNO & POISSON
Sample no. 98-UKT-12, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 300.

Figure 11 ***Pantanellium rothwelli*** PESSAGNO & BLOME
Sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 12-13 ***Ferresium philippinense*** YEH & CHENG
12. Sample no.94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian, x 330.
13. Sample no. 98-UKT-19, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 14 ***Ferresium triquetrum*** CARTER
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 15 ***Ferresium* sp. A**
Sample no. 98-UKT-19, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150.

Figure 16 ***Risella ellisensis*** CARTER
Sample no. 98-UKT-21, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

PLATE 13

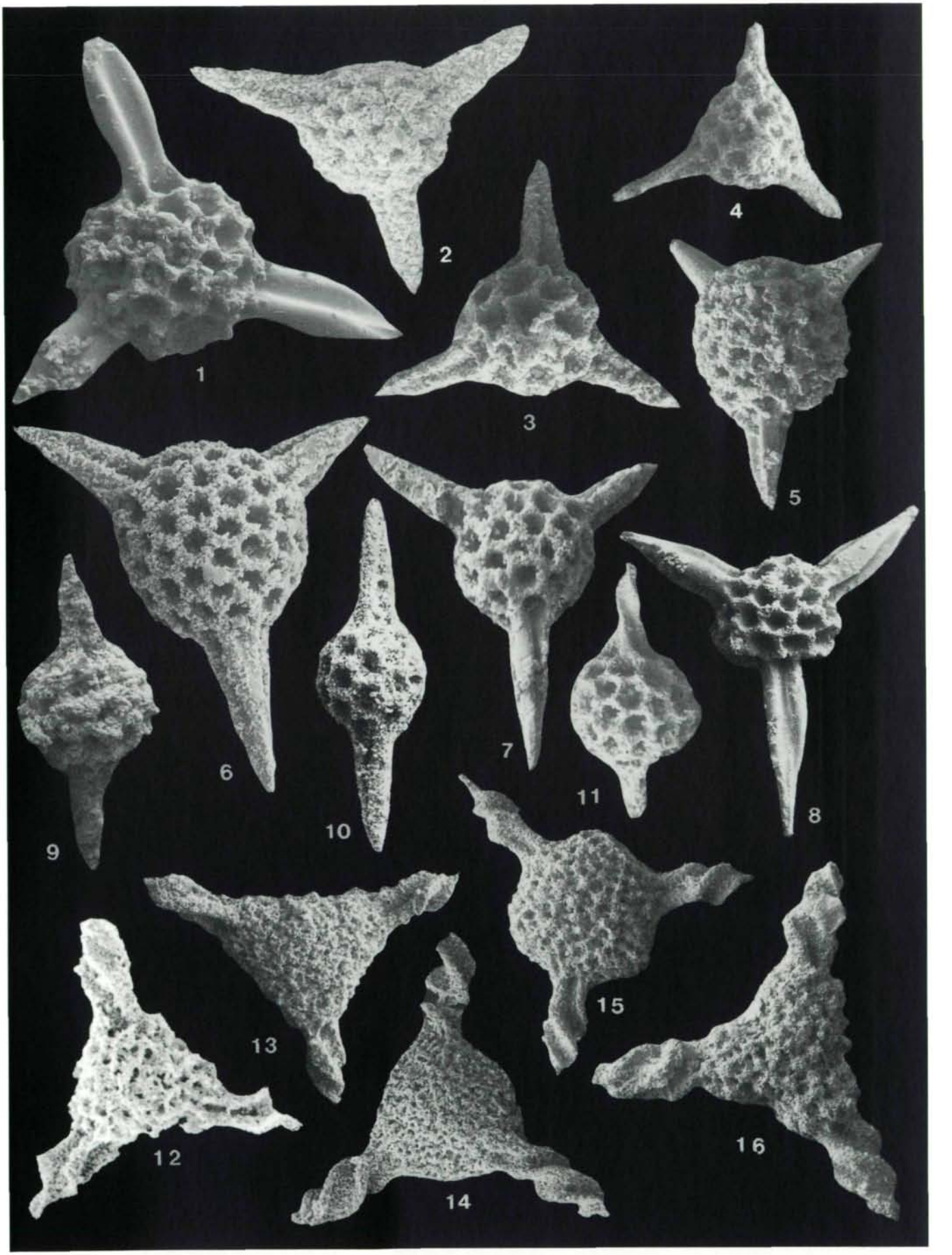

PLATE 14

Scanning electron micrographs of **Spumellaria**-Family **Ferresidae, Gomberellidae, Intermediellidae** and **Oertlispongidae** from Taurus Mountains. Py: Pyritized Radiolaria.

Figures 1-2 ***Risella stalkungiensis*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
1. Sample no. 98-UKT-19, Rhaetian, x 200,
2. Sample no. 98-UKT-21, Rhaetian, x 200.

Figures 3-4 ***Risella tledoensis*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
3. Sample no. 96-UKT-476, Rhaetian, x 200,
4. Sample no. 96-UKT-476, Rhaetian, x 200.

Figure 5 ***Risella* sp. A** CARTER
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 6-7 ***Karnospongella bispinosa*** KOZUR & MOSTLER
6. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200,
7. Sample no. 98-UKT-61, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 8 ***Paurinella acutispinosa*** KOZUR & MOSTLER
Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 9 ***Paurinella latispinosa*** KOZUR & MOSTLER
Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 290.

Figure 10 ***Falcispongus falciformis* aff. *minor*** KOZUR & MOSTLER
Sample no. 96-UKT-531, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250.

Figure 11 ***Scutispongus latus*** KOZUR & MOSTLER
Sample no. 96-UKT-548, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 12 ***Scutispongus ? parvifoliatus parvifoliatus*** KOZUR & MOSTLER
Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 13 ***Pterospongus patrulii*** DUMITRICA
Sample no. 96-UKT-521, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/? *P. priscus* Rad. Subz.), x 145.

Figure 14 ***Scutispongus ploechingeri ploechingeri*** KOZUR & MOSTLER
Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

PLATE 14

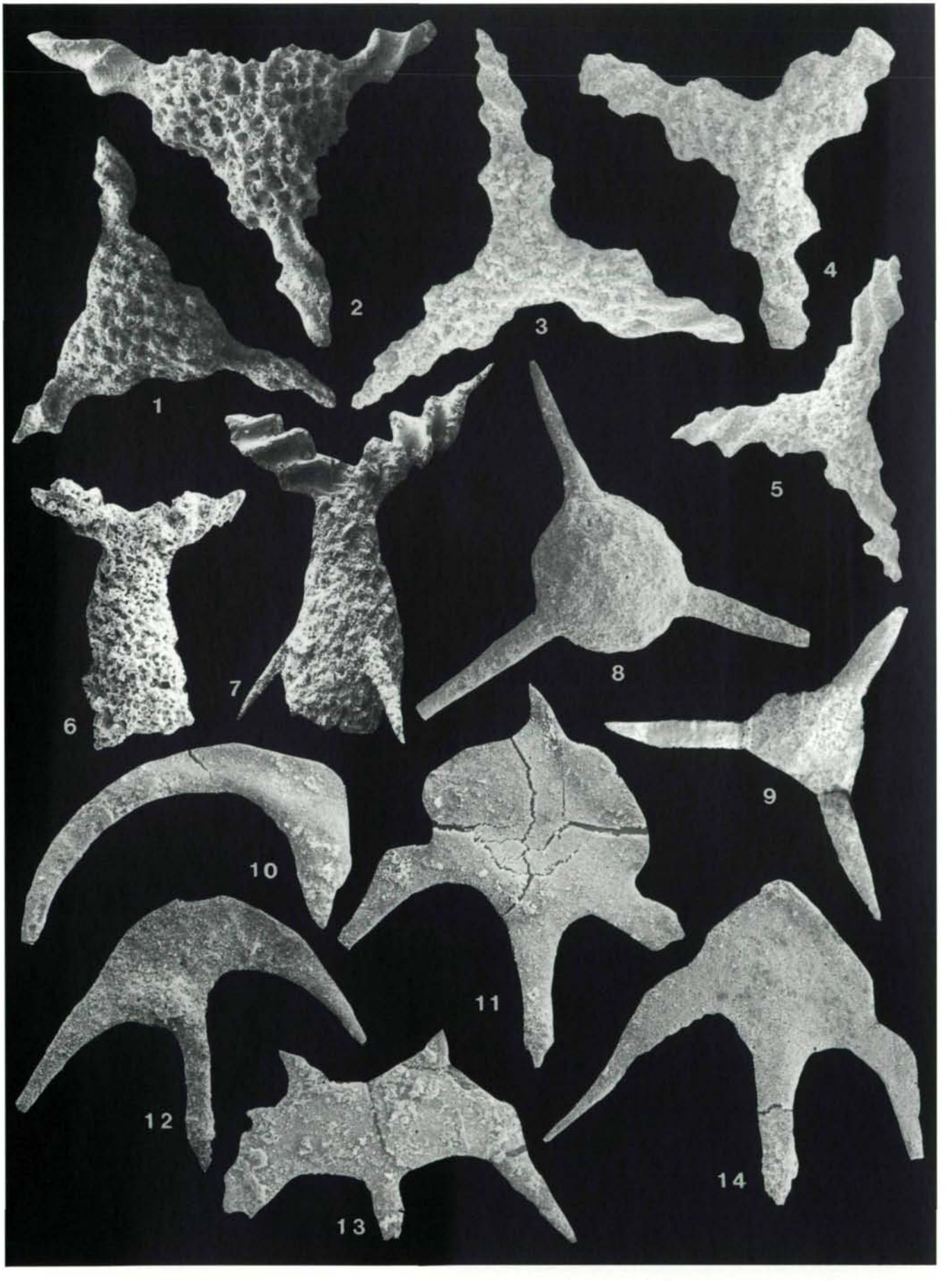

PLATE 15

Scanning electron micrographs of **Spumellaria**-Family **Oertlispongidae** from Taurus Mountains.

Figure 1 ***Scutispongus rostratus rostratus*** (DUMITRICA)
Sample no. 96-UKT-525, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. rarauana* Rad. Subz.), x 250.

Figure 2 ***Scutispongus tortilispinus*** KOZUR & MOSTLER
Sample no. 96-UKT-530, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 3 ***Scutispongus undulatus*** (DUMITRICA)
Sample no. 96-UKT-544, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250.

Figure 4 ***Spongoserrula bidentata*** KOZUR & MOSTLER
Sample no. 96-UKT-533, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 5 ***Spongoserrula bifurcata bifurcata*** KOZUR & MOSTLER
Sample no. 96-UKT-528, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 6 ***Spongoserrula fluegeli fluegeli*** KOZUR & MOSTLER
Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250.

Figures 7-8 ***Spongoserrula rarauana rarauana*** DUMITRICA
7. Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
8. Sample no. 96-UKT- 527, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 9 ***Spongoserrula rarauana trinodosa*** KOZUR & MOSTLER
Sample no. 96-UKT-527, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 10 ***Spongoserrula semicircularis*** KOZUR & MOSTLER
Sample no. 96-UKT-528, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250.

Figure 11 ***Steigerispongus subsymmetricus latopediculus*** KOZUR & MOSTLER
Sample no. 96-UKT-530, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 12 ***Steigerispongus asymmetricus triangulodentatus*** KOZUR & MOSTLER
Sample no. 96-UKT-544, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/* S.fluegeli Rad. Subz.), x 200.

Figure 13 ***Steigerispongus subsymmetricus subsymmetricus*** KOZUR & MOSTLER
Sample no. 96-UKT-545, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

PLATE 15

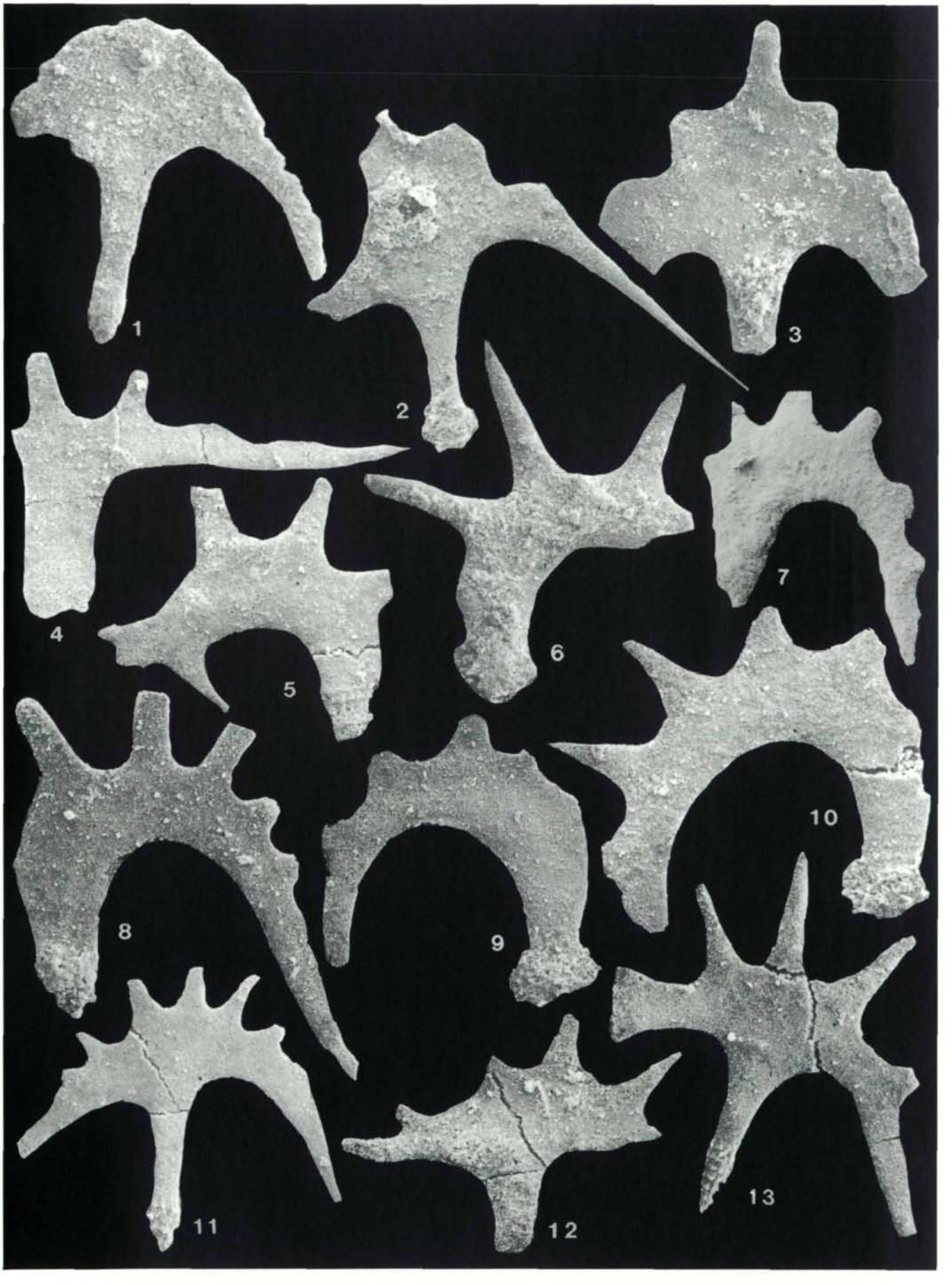

PLATE 16

Scanning electron micrographs of **Spumellaria**-Family **Parasaturnalidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Heliosaturnalis transitus*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 2 ***Japonisaturnalis multiperforatus*** (KOZUR & MOSTLER)
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figure 3 ***Palaeosaturnalis dotti*** (BLOME) Group
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), x 250.

Figures 4-6 ***Palaeosaturnalis dumitricai*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Paratype, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 150,
6. Paratype, sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 7-9 ***Palaeosaturnalis hugluensis*** n. sp.
Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe,
7. Holotype, sample no. 96-UKT-707, middle Carnian, x 100,
8. Paratype, sample no. 96-UKT-707, middle Carnian, x 150,
9. Paratype, sample no. 96-UKT-707, middle Carnian, x 150.

Figure 10 ***Palaeosaturnalis karnicus*** (KOZUR & MOSTLER)
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 16

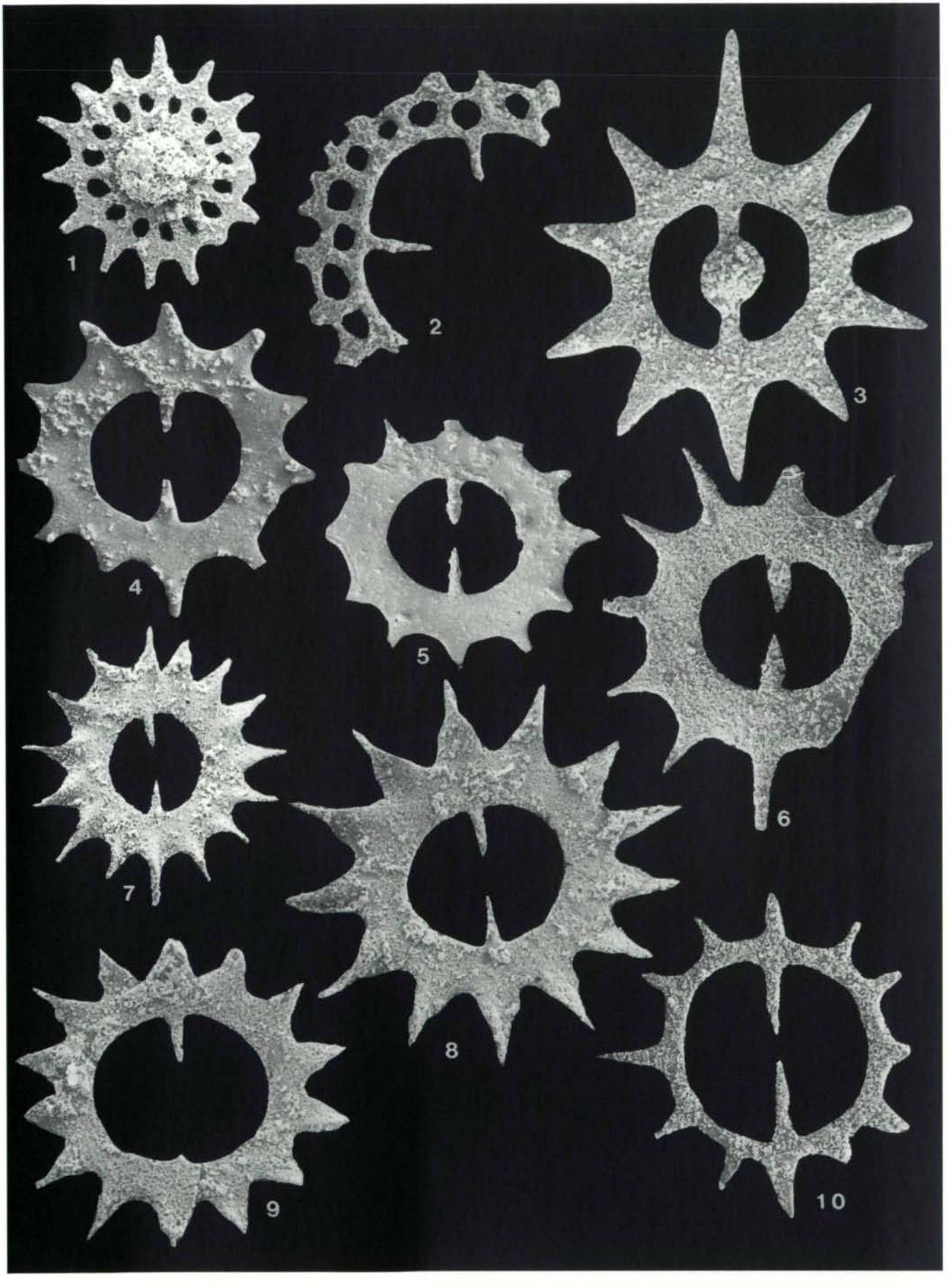

PLATE 17

Scanning electron micrographs of **Spumellaria**-Family **Parasaturnalidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Palaeosaturnalis latiannulatus*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
2. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 3 ***Palaeosaturnalis mocki*** KOZUR & MOSTLER
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 4-5 ***Palaeosaturnalis raridenticulatus*** KOZUR & MOCK
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 6-7 ***Palaeosaturnalis triassicus*** (KOZUR & MOSTLER)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 100.

Figures 8-11 ***Palaeosaturnalis* spp.**
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Sample no. 96-UKT-584, early Carnian, x 200,
9. Sample no. 96-UKT-575, early Carnian, x 200,
10. Sample no. 96-UKT-560, early Carnian (*T. kretaensis* Rad. Z.), x 200,
11. Sample no. 96-UKT-575, early Carnian, x 200.

PLATE 17

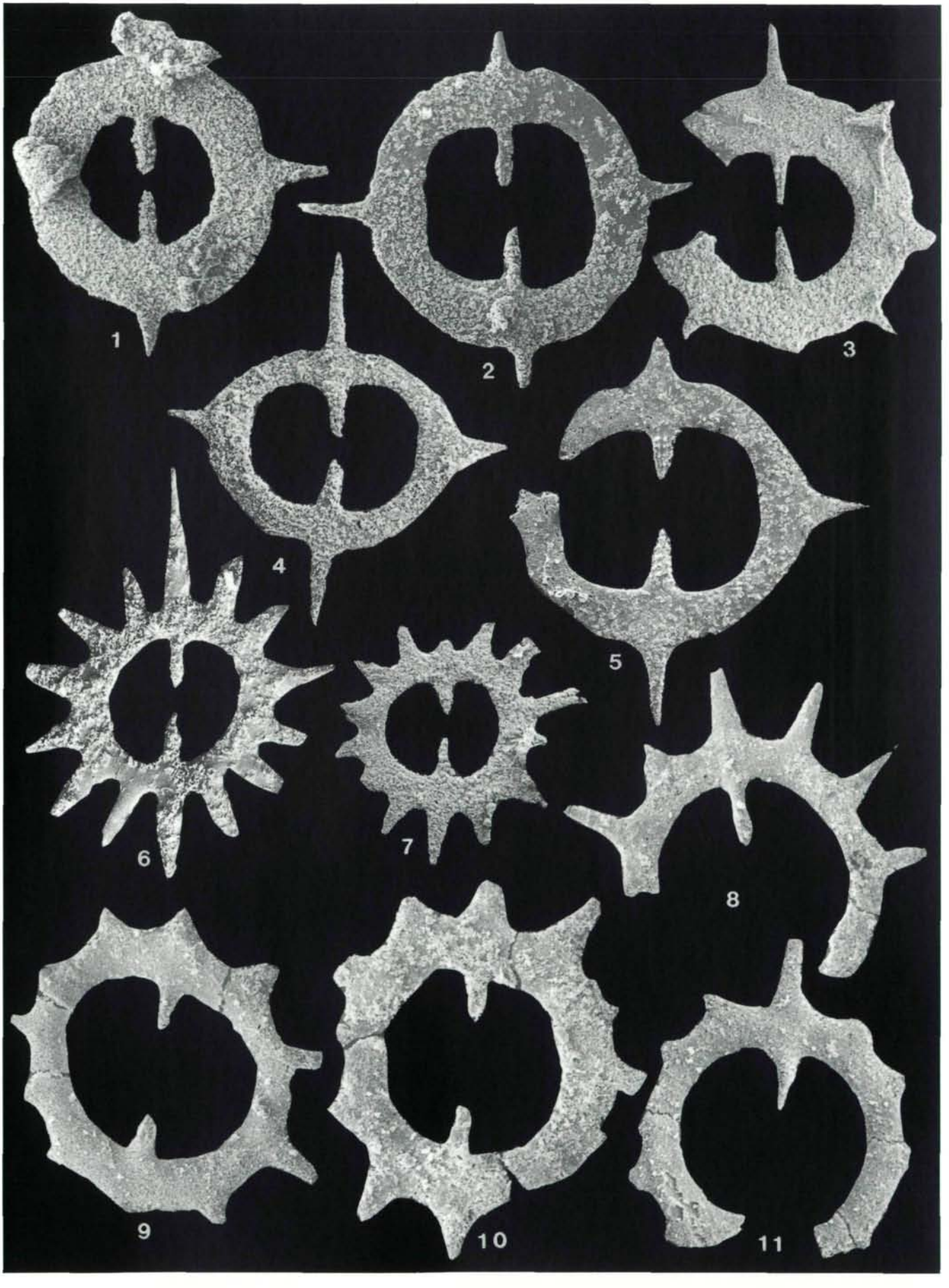

PLATE 18

Scanning electron micrographs of **Spumellaria**-Family **Parasaturnalidae** from Taurus Mountains and Ankara region.

Figure 1 ***Praehexasaturnalis burnensis*** (BLOME)
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), x 150.

Figure 2 ***Praehexasaturnalis tenuispinosus*** (DONOFRIO & MOSTLER)
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), x 150.

Figures 3-5 ***Praemesosaturnalis ellipticus*** n. sp.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
3. Holotype, sample no. 96-UKT-476, Rhaetian, x 150,
4. Paratype, sample no. 96-UKT-476, Rhaetian, x 200,
5. Paratype, sample no. 96-UKT-476, Rhaetian, x 200.

Figure 6 ***Praemesosaturnalis pseudokahleri*** SUGIYAMA
Sample no. 94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian , x 150.

Figures 7-8 ***Praemesosaturnalis rugosus yehae*** n. subsp.
Ankara Ophiolitic Melange, Ankara,
7. Sample no. 94-B-1-7, late Norian, x 150,
8. Sample no. 94-B-1-7, late Norian, x 150.

Figure 9 ***Praemesosaturnalis sandspitense*** (BLOME)
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

PLATE 18

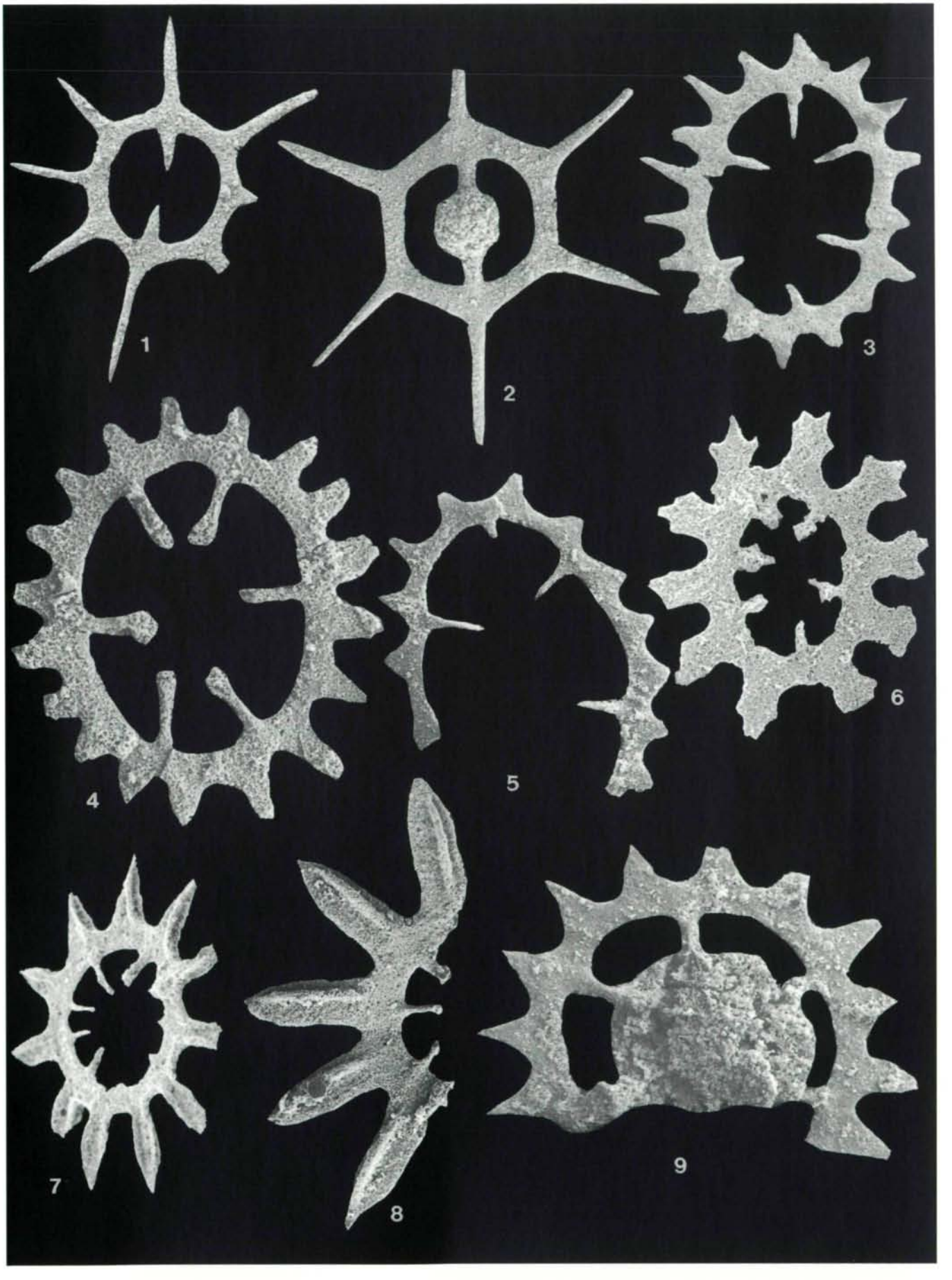

PLATE 19

Scanning electron micrographs of **Spumellaria**- Family **Parasaturnalidae** and **Pseudoacanthocircidae** from Taurus Mountains. Py: Pyritized Radiolaria.

Figures 1-2 ***Pseudoheliodiscus elongatus*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Holotype, sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 200,
2. Paratype, sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 150.

Figure 3 ***Pseudoheliodiscus primitivus*** (KOZUR & MOSTLER)
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 4 ***Pseudoheliodiscus validus*** (DONOFRIO & MOSTLER)
Sample no. 96-UKT-676, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. triangularis* Con. Z.), Py., x 200.

Figures 5-6 ***Stauroacanthocircus kayai*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
5. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150,
6. Paratype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 100.

Figures 7-8 ***Stauroacanthocircus ? poetschensis*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 150,
8. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 100.

Figure 9 ***Pseudoacanthocircus* sp. A**
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 10-12 ***Pseudoacanthocircus sugiyamai*** n. sp.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
10. Holotype, sample no. 98-UKT-17, Rhaetian, x 200,
11. Paratype, sample no. 98-UKT-17, Rhaetian, x 200,
12. Paratype, sample no. 96-UKT-476, Rhaetian, x 200.

PLATE 19

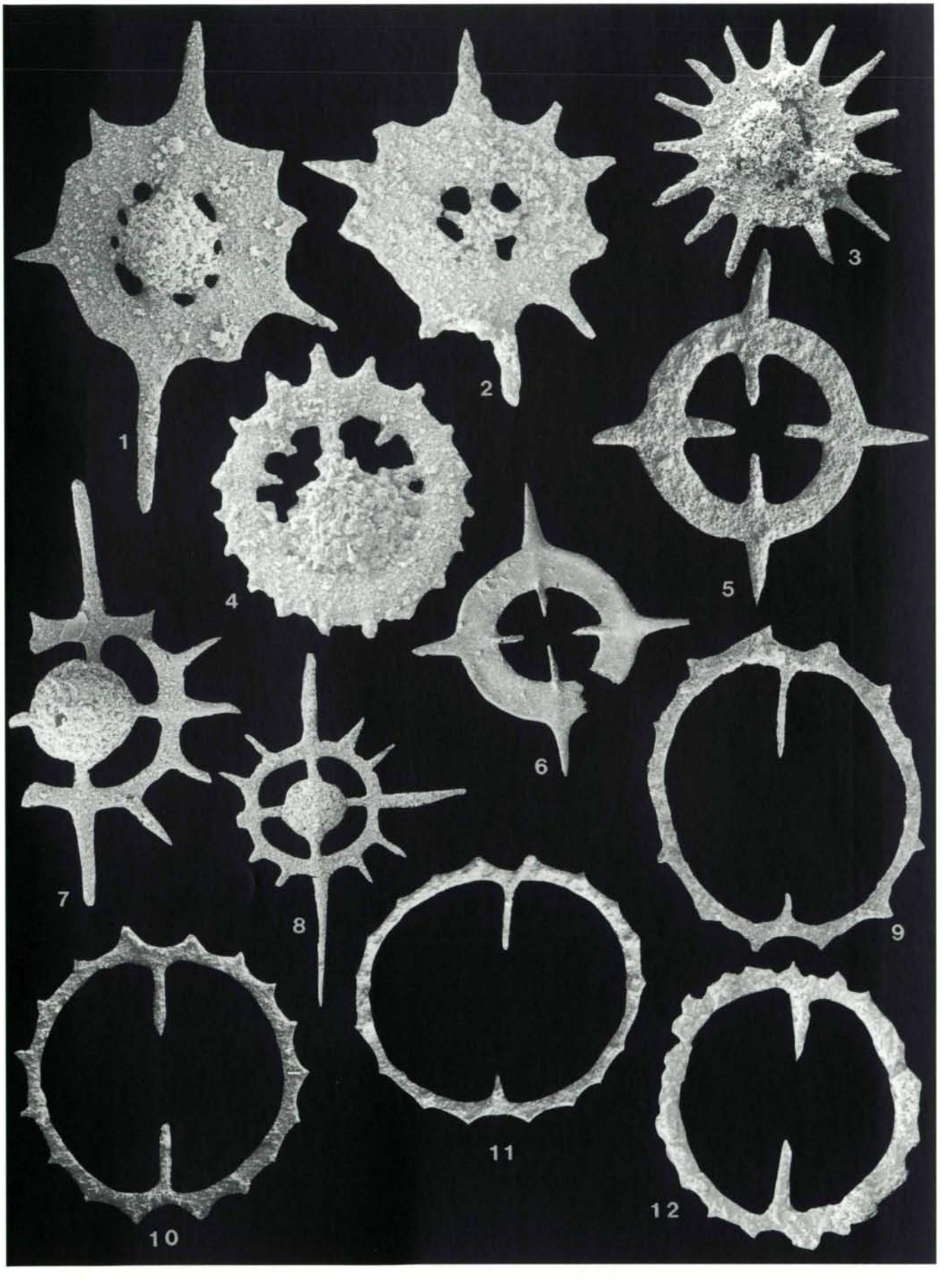

PLATE 20

Scanning electron micrographs of **Spumellaria**-Family **Veghicyclidae** and **Orbiculiformidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Veghicyclia austrica*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 2 ***Veghicyclia* sp. aff. *V. globosa*** KOZUR & MOSTLER
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 3 ***Veghicyclia haeckeli*** KOZUR & MOSTLER
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 4 ***Orbiculiforma cedrosensis*** PESSAGNO
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 5-7 ***Orbiculiforma gazipasaensis*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

5. Holotype, sample no. 96-UKT-524, late Ladinian (*M. cochleata/ S. rarauana* Rad.Subz.), x 200,
6. Paratype, sample no. 96-UKT-526, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
7. Paratype, sample no. 98-UKT-566, early Carnian (*T. kretaensis* Rad. Z.), x 200.

Figures 8-9 ***Orbiculiforma goestlingensis*** (KOZUR & MOSTLER) n. comb.

8. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100,
9. Sample no. 96-UKT-584, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian, x 150.

Figure 10 ***Orbiculiforma karnica*** (KOZUR & MOSTLER) n. comb.
Sample no. 96-UKT-527, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150.

PLATE 20

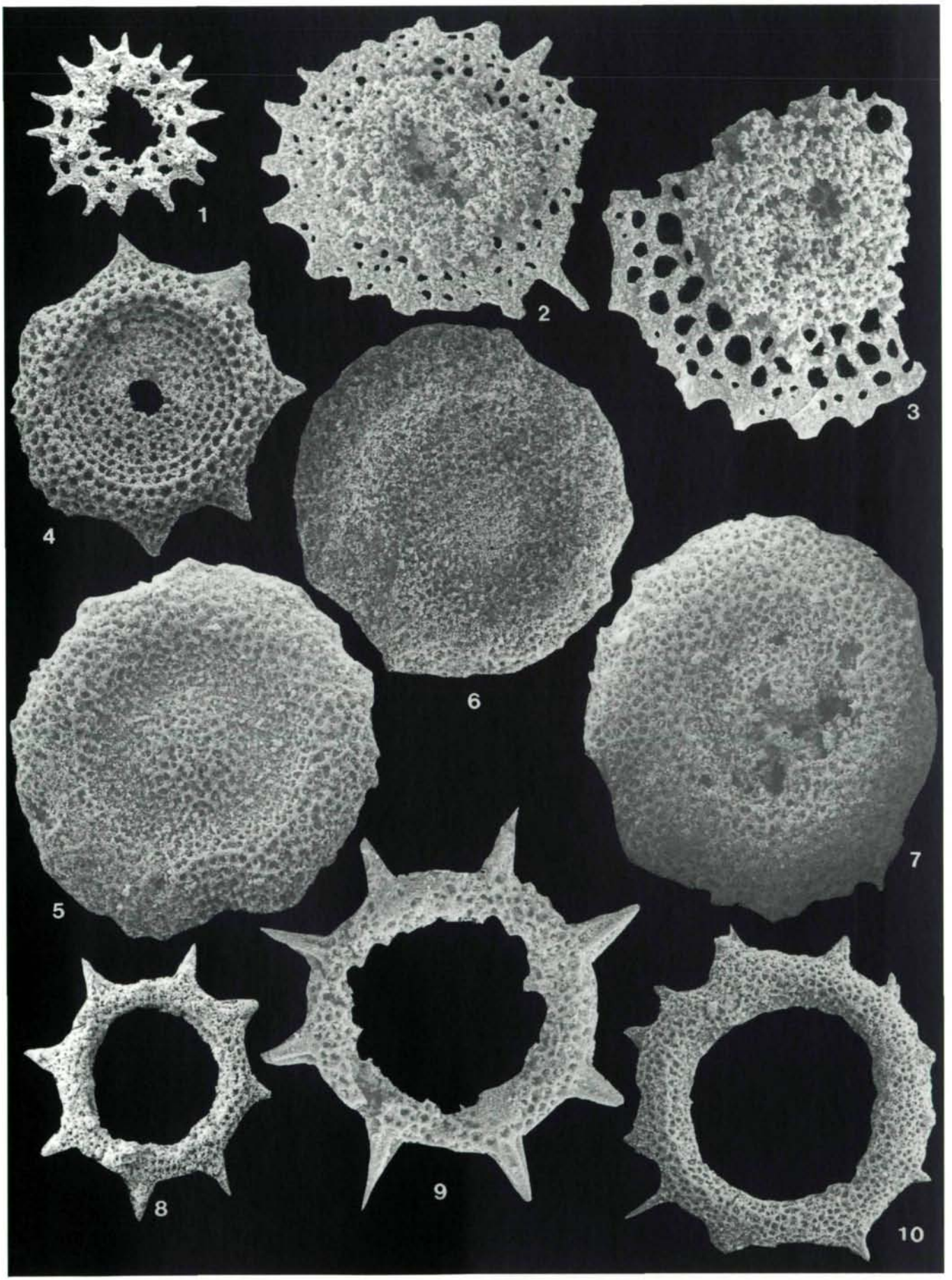

PLATE 21

Scanning electron micrographs of **Spumellaria**-Family **Orbiculiformidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3 ***Orbiculiforma octogonalis*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-133, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.
3. Paratype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 4 ***Orbiculiforma plana*** (KOZUR & MOSTLER) n. comb.

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 5 ***Orbiculiforma vulgaris*** (KOZUR & MOSTLER) n. comb.

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 6 ***Orbiculiforma* sp. A**

Sample no. 96-UKT-662, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 7-8 ***Pseudogodia sonmezi*** n. gen., n. sp.

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

7. Holotype, sample no. 96-UKT-544, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
8. Paratype, sample no. 98-UKT-549, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

PLATE 21

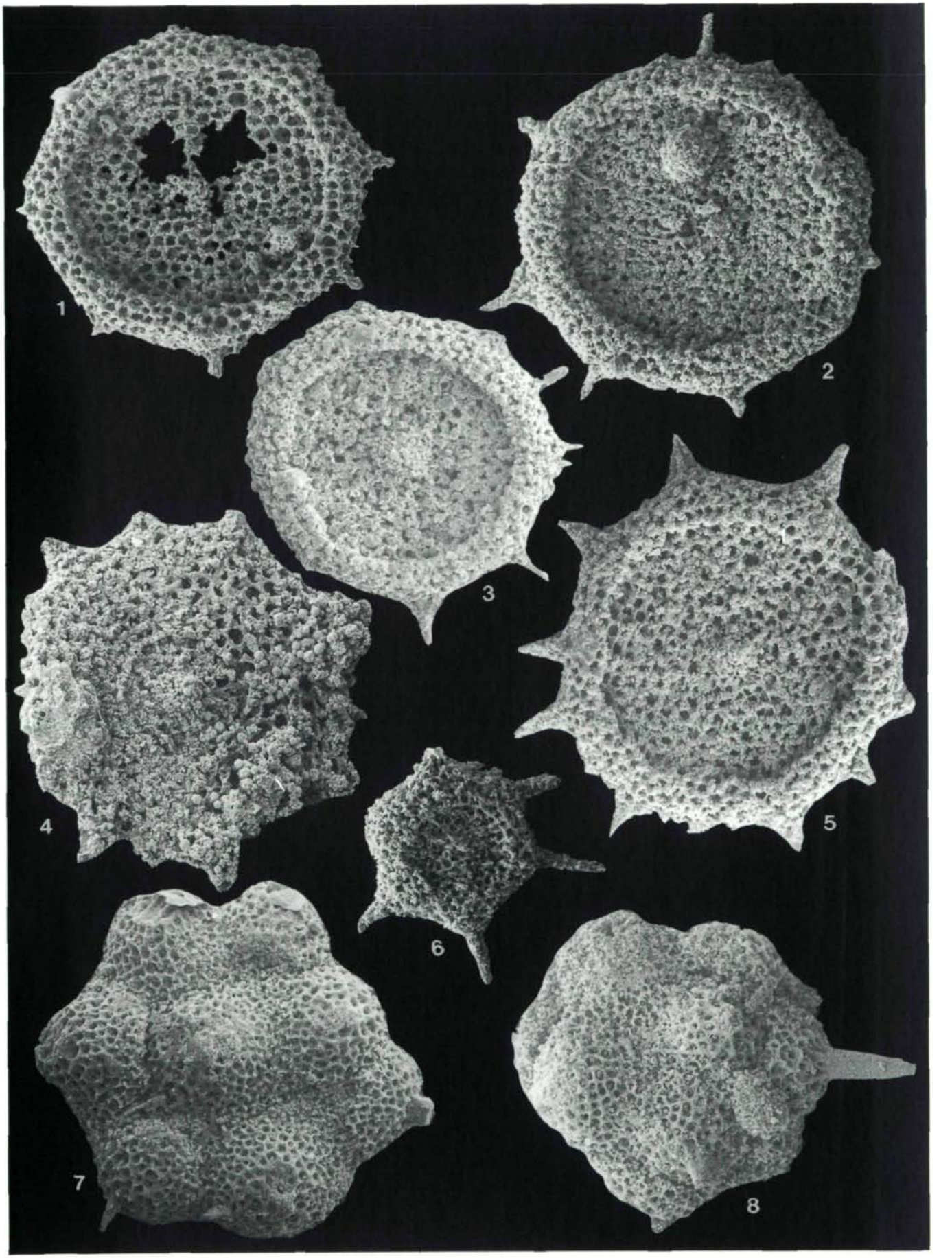

PLATE 22

Scanning electron micrographs of **Spumellaria**-Family **Relindellidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Pentaspongodiscus crosi*** KELLICI & DE WEVER n. comb.
Sample no. 96-UKT-526, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figures 2-4 ***Pentaspongodiscus ? dihexacanthus*** CARTER Group
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
2. Specimen with short peripheral spines, sample no. 98-UKT-17, Rhaetian, x 200,
3. Specimen with short peripheral spines, sample no. 98-UKT-16, Rhaetian, x 200,
4. Specimen with long peripheral spines, sample no. 96-UKT-476, Rhaetian, x 200.

Figures 5-7 ***Pentaspongodiscus discoides*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
5. Holotype, sample no. 96-UKT-522, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 200,
6. Paratype, sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 160,
7. Paratype, sample no. 96-UKT-524, late Ladinian (*M. cochleata/ S. rarauana* Rad. Subz.), x 200.

Figures 8-9 ***Pentaspongodiscus steigeri*** LAHM
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Sample no. 96-UKT-545, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150,
9. Sample no. 96-UKT-531, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 10 ***Tetraspongodiscus nazarovi*** (KOZUR & MOSTLER)
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

PLATE 22

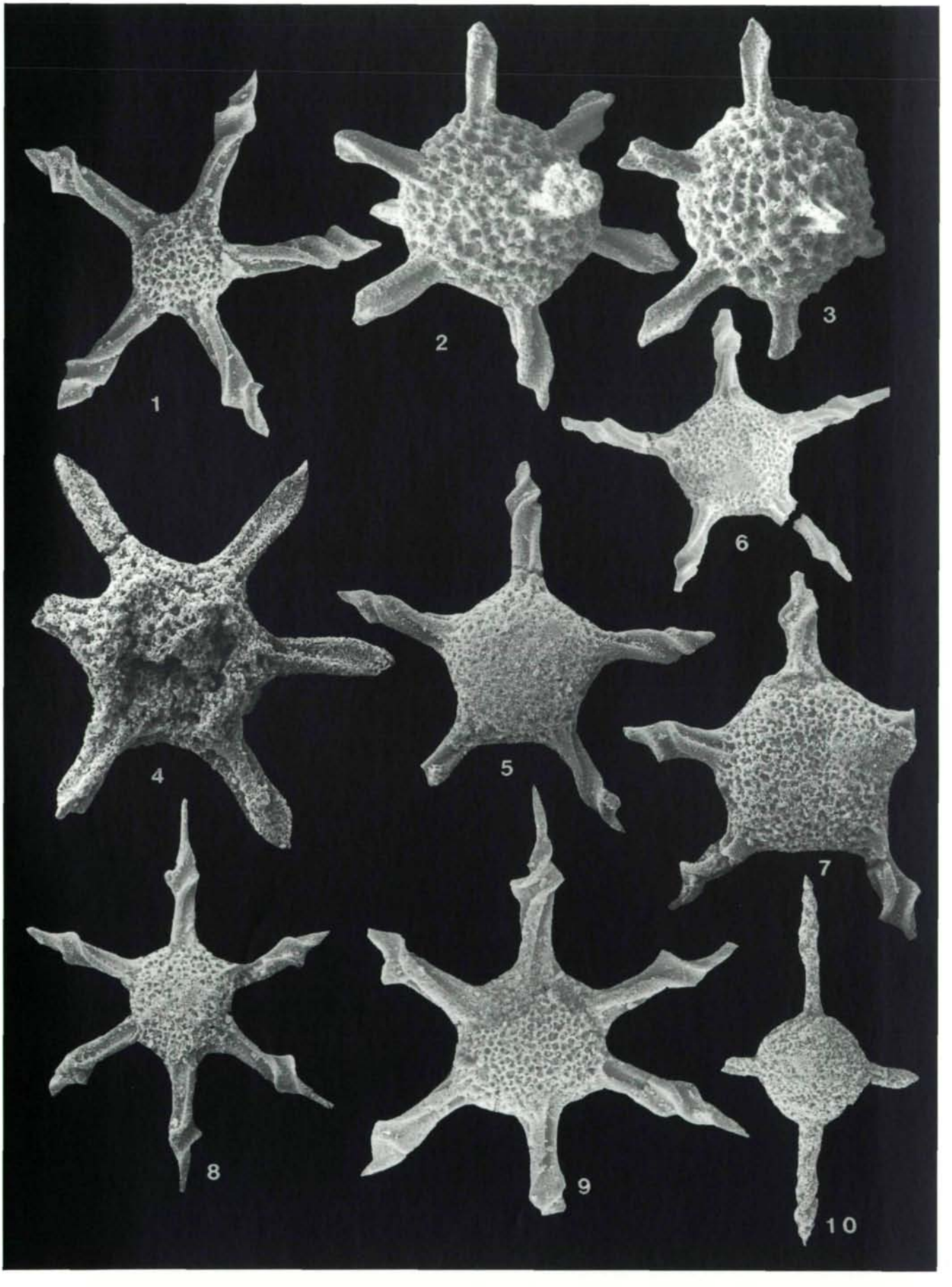

PLATE 23

Scanning electron micrographs of **Spumellaria Incertae Sedis** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3 ***Tauridastrum longitubus*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
2. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 150,
3. Detail of cortical shell, same as fig. 1, x 500,

Figures 4-6 ***Xiphosphaera fistulata*** CARTER

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

4. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 130,
5. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 100,
6. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 150.

Figure 7 **Spumellaria gen. and sp. indet. A**

Sample no. 98-UKT-12, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 300.

Figures 8-11 **Spumellaria gen. and sp. indet. B**

8. Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200,
9. Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300,
10. Sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200,
11. Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

PLATE 23

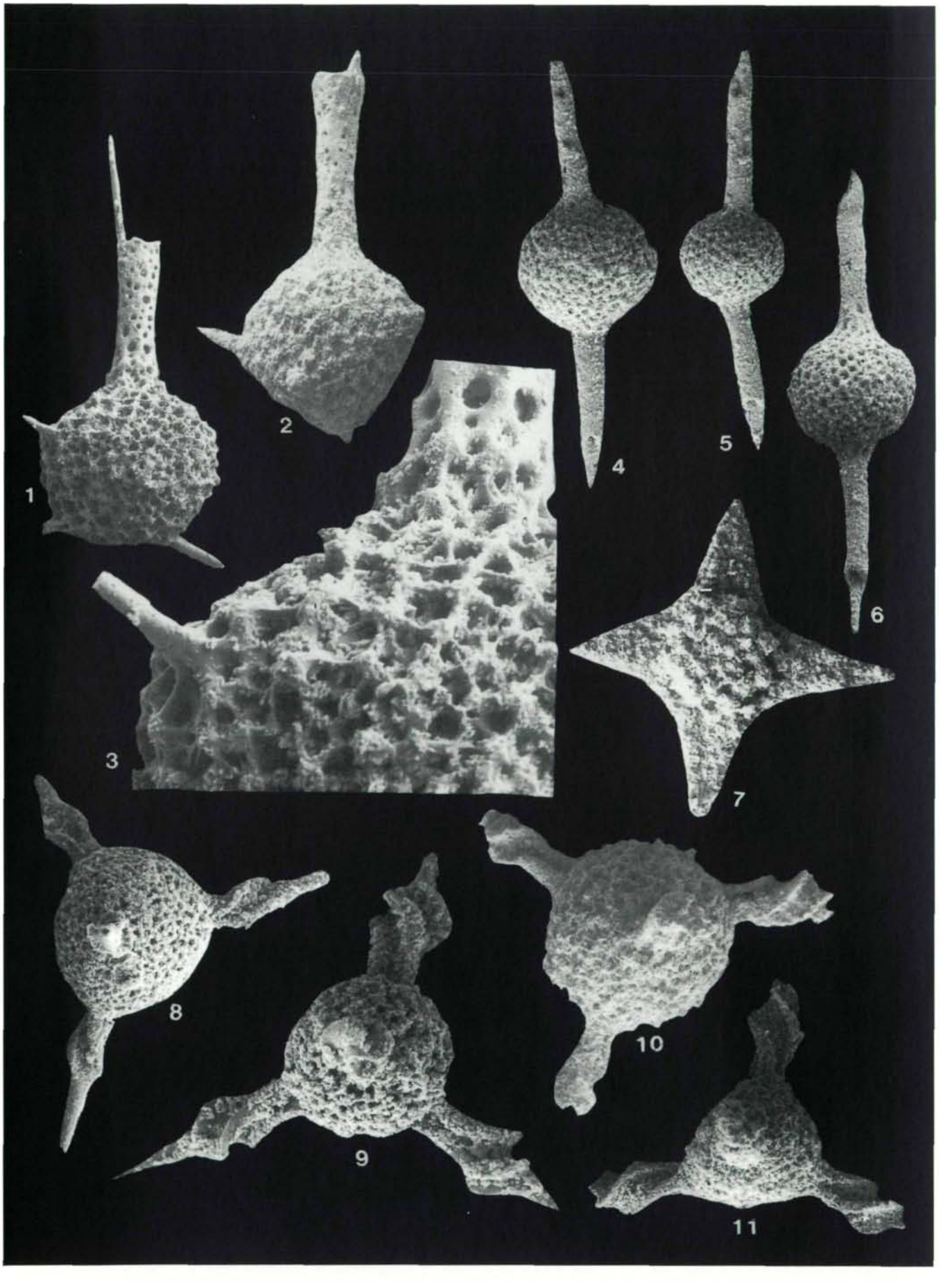

PLATE 24

Scanning electron micrographs of **Entactinaria**-Family **Aurisaturnalidae** and **Eptingidae** from Taurus Mountains and Ankara Region.

Figure 1 ***Hungarosaturnalis longobardica*** KOZUR & MOSTLER
Sample no. 96-UKT-521, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ ? *P. priscus* Rad. Subz.), x 200.

Figure 2 ***Hungarosaturnalis multispinosa*** KOZUR & MOSTLER
Sample no. 96-UKT-524, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M.cochleata*/ *S. rarauana* Rad. Subz.), x 200.

Figure 3 ***Hungarosaturnalis pileatus*** (NAKASEKO & NISHIMURA)
Sample no. 96-UKT-529, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 200.

Figure 4 ***Ornatisaturnalis ingridae*** MOSTLER & KRAINER
Sample no. 96-UKT-530, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 200.

Figure 5 ***Ornatisaturnalis quadrispinosus*** MOSTLER & KRAINER
Sample no. 96-UKT-551, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian (*T. kretaensis* Rad. Z.), x 200.

Figure 6 ***Cryptostephanidium cornigerum*** DUMITRICA
Sample no. 96-UKT-532, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 400.

Figures 7-8 ***Cryptostephanidium goncuoglui*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Holotype, sample no. 96-UKT-530, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 400,
8. Paratype, sample no. 96-UKT-531, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 300.

Figures 9-11 ***Pylostephanidium ankaraense*** BRAGIN & TEKIN
Ankara Ophiolitic Melange, Ankara,
9. Sample no. 94-B-1-7, late Norian, x 220,
10. Sample no. 94-B-1-7, late Norian, x 240,
11. Sample no. 94-B-1-7, late Norian, x 255.

PLATE 24

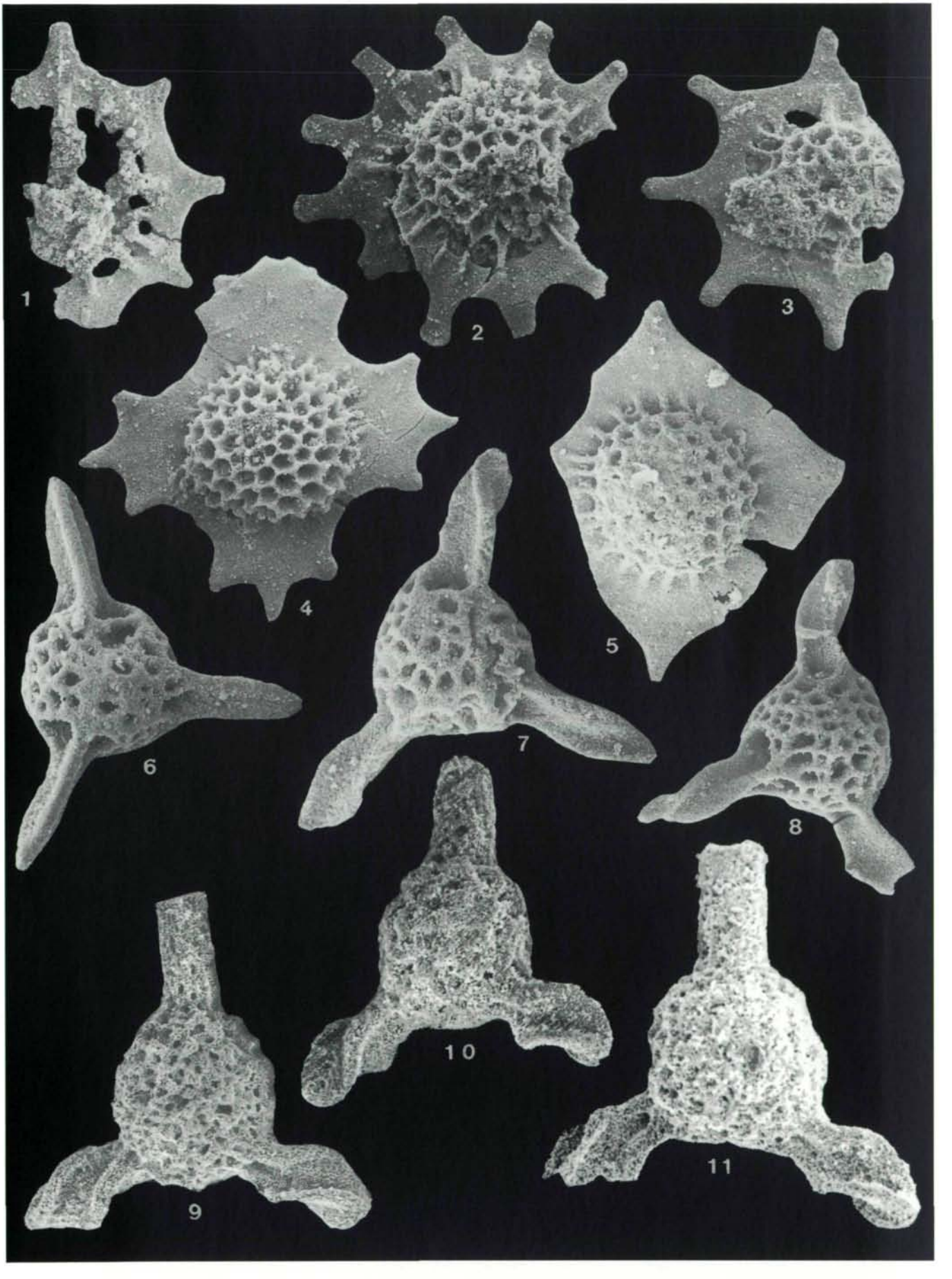

PLATE 25

Scanning electron micrographs of **Entactinaria**-Family **Hexaporobrachiidae, Multiarcusellidae, Spongosaturnaloididae** and **Hindeosphaeridae** from Taurus Mountains and Ankara region. Py.: Pyritized Radiolaria.

Figure 1 ***Tetraporobrachia composita*** CARTER
Sample no. 94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian , x 180.

Figure 2 ***Tetraporobrachia haeckeli*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figures 3-4 ***Triarcella sulovensis*** KOZUR & MOCK
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
3. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 5 ***Spongosaturnaloides multidentatus*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figures 6-7 ***Hindeosphaera bispinosa*** KOZUR & MOSTLER
Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe,
6. Sample no. 96-UKT-707, middle Carnian x 200,
7. Sample no. 96-UKT-707, middle Carnian x 150.

Figure 8 ***Pseudostylosphaera coccostyla coccostyla*** (RÜST)
Sample no. 96-UKT-527, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150.

Figure 9 ***Pseudostylosphaera goestlingensis*** (KOZUR & MOSTLER)
Sample no. 96-UKT-524, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. rarauana* Rad. Subz.), x 150.

Figures 10-11 ***Pseudostylosphaera gracilis*** KOZUR & MOCK
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150,
11. Sample no. 96-UKT-524, late Ladinian (*M. cochleata/ S. rarauana* Rad. Subz.), x 140.

Figure 12 ***Pseudostylosphaera hellenica*** (DE WEVER)
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 13 ***Pseudostylosphaera imperspicua*** (BRAGIN) n. comb.
Sample no. 96-UKT-521, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 100.

Figure 14 ***Pseudostylosphaera longispinosa*** KOZUR & MOSTLER
Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150.

Figure 15 ***Pseudostylosphaera nazarovi*** (KOZUR & MOSTLER)
Sample no. 96-UKT-562, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian (*T. kretaensis* Rad. Z.), x 200.

PLATE 25

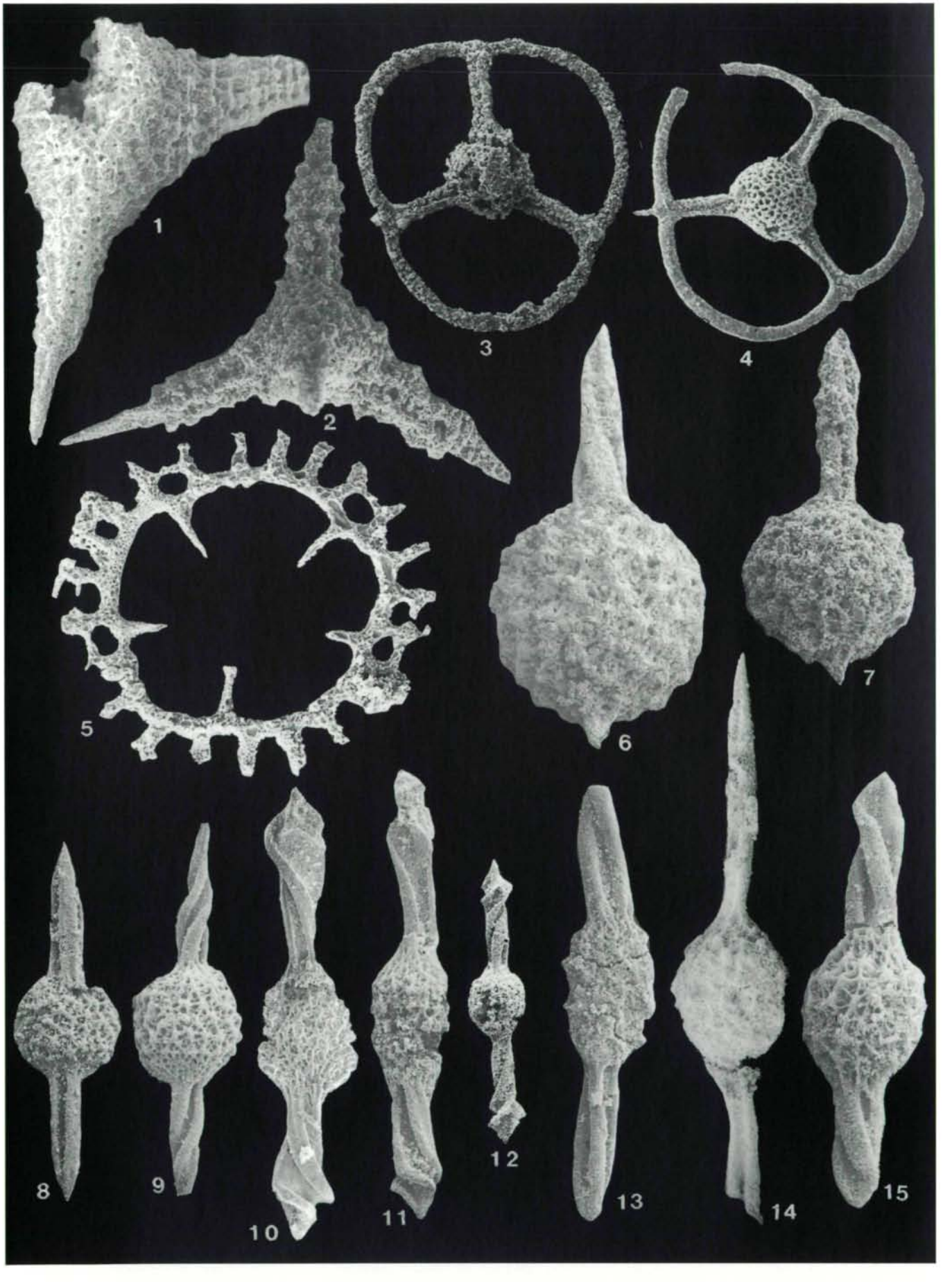

PLATE 26

Scanning electron micrographs of **Entactinaria**-Family **Muelleritortidae** from Taurus Mountains.

Figure 1 ***Muelleritortis bosniensis*** KOZUR & MOSTLER
Sample no. 96-UKT-533, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250.

Figures 2-3 ***Muelleritortis cive*** SUGIYAMA
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
2. Sample no. 96-UKT-533, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 250,
3. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 160.

Figures 4-5 ***Muelleritortis cochleata cochleata*** (NAKASEKO & NISHIMURA)
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 100,
5. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 125.

Figure 6 ***Muelleritortis cochleata koeveskalensis*** KOZUR
Sample no. 96-UKT-522, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 150.

Figure 7 ***Muelleritortis cochleata tumidospina*** KOZUR
Sample no. 96-UKT-522, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 200.

Figure 8 ***Muelleritortis expansa*** KOZUR & MOSTLER
Sample no. 96-UKT-525, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. rarauana* Rad. Subz.), x 150.

Figures 9-10 ***Muelleritortis longispinosa*** KOZUR
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
9. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 75,
10. Sample no. 96-UKT-526, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 100.

Figure 11 ***Pentatortis* sp. A**
Sample no. 96-UKT-528, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

PLATE 26

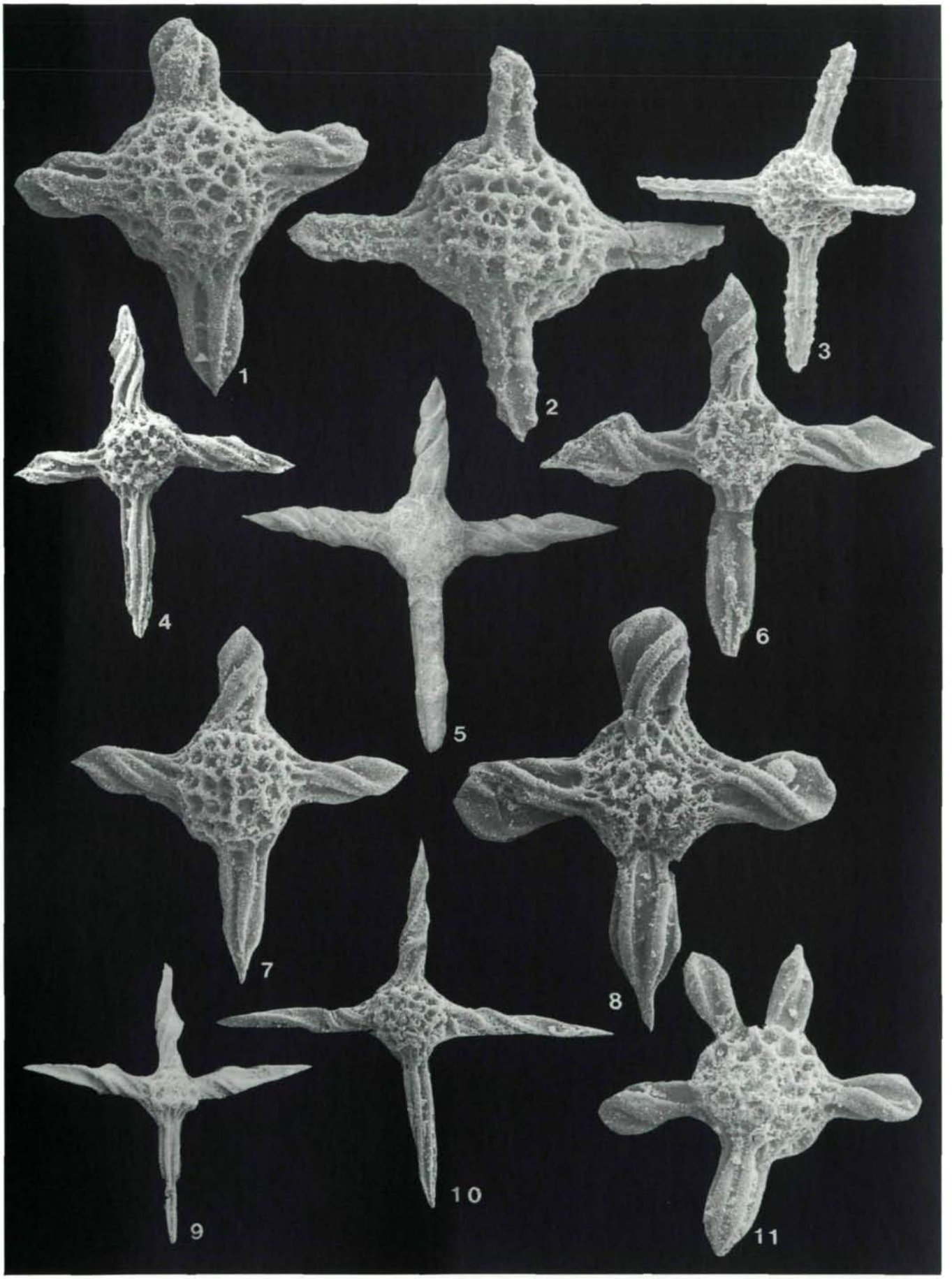

PLATE 27

Scanning electron micrographs of **Entactinaria**-Family **Muelleritortidae, Pentactinocarpidae** and **Entactinaria Incertae Sedis** from Taurus Mountains and Ankara region. Py.: Pyritized Radiolaria.

Figure 1 ***Tritortis ariana*** (CORDEY et al.) Group
Sample no. 94-UKT-43, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian (*T. kretaensis* Rad. Z.), x 100.

Figure 2 ***Tritortis balatonica*** KOZUR
Sample no. 96-UKT-545, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 3 ***Tritortis kretaensis dispiralis*** (BRAGIN)
Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figures 4-5 ***Tritortis kretaensis kretaensis*** (KOZUR & KRAHL)
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Sample no. 96-UKT-566, early Carnian (*T. kretaensis* Rad. Z.), x 100,
5. Sample no. 96-UKT-549, latest Ladinian (Top of the *M.cochleata/ S. fluegeli* Rad. Subz.), x 150.

Figure 6 ***Pentactinocarpus acanthicus*** DUMITRICA
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figures 7-8 ***Pentactinocarpus sevaticus*** KOZUR & MOSTLER
7. Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200,
8. Sample no. 94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian , x 200

Figures 9-10 ***Pentactinocarpus tetracanthus*** DUMITRICA
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
9. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
10. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 11-12 ***Braginella rudis*** (BRAGIN)
Ankara Ophiolitic Melange, Ankara,
11. Sample no. 94-B-1-7, late Norian, x 180,
12. Sample no. 94-B-1-7, late Norian, x 400.

PLATE 27

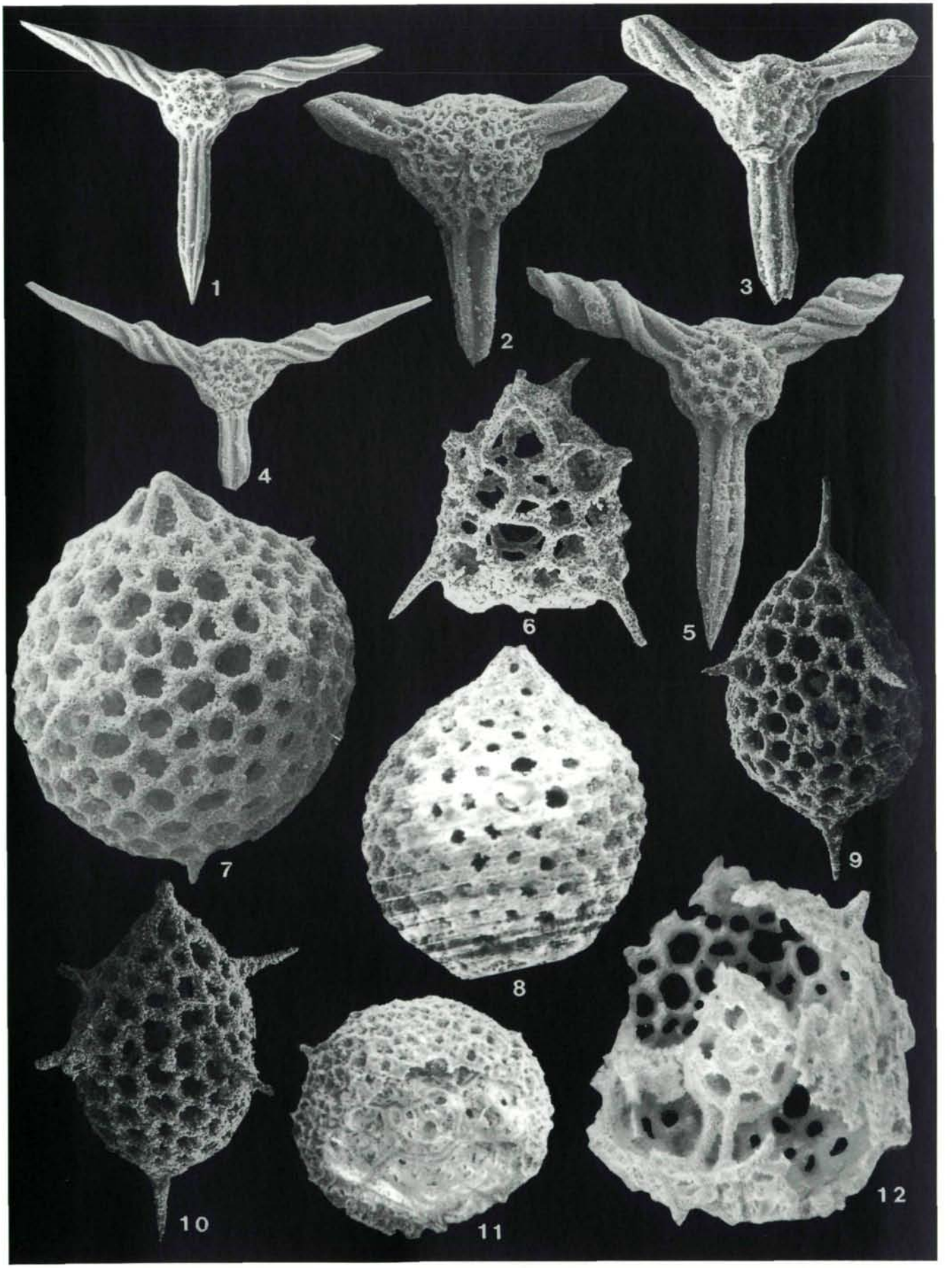

PLATE 28

Scanning electron micrographs of **Nassellaria**-Family **Bulbocyrtidae** and **Canoptidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Bulbocyritium dryites*** SUGIYAMA
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Sample no. 96-UKT-530, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300,
2. Sample no. 96-UKT-530, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 400.

Figures 3-4 ***Bulbocyritium globosus*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
3. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
4. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 5 ***Bulbocyritium insolitus*** (BLOME) n. comb.
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 6-7 ***Bulbocyritium reticulatum*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 250,
7. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 8-9 ***Canoptum cucurbita*** (SUGIYAMA)
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Sample no. 96-UKT-548, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
9. Sample no. 96-UKT-548, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300.

Figures 10-12 ***Canoptum inornatus*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Holotype, sample no. 96-UKT-559, early Carnian (*T. kretaensis* Rad. Z.), x 200.
11. Detail of the test, same as fig. 10, x 500,
12. Paratype, sample no. 94-UKT-42, late Ladinian (*M. cochleata/S. fluegeli* Rad. Subz.), x 150.

Figures 13-15 ***Canoptum levis*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
13. Holotype, sample no. 96-UKT-544, late Ladinian (*M. cochleata/S. fluegeli* Rad. Subz.), x 300.,
14. Paratype, sample no. 94-UKT-42, late Ladinian (*M. cochleata/S. fluegeli* Rad. Subz.), x 375,
15. Paratype, sample no. 94-UKT-42, late Ladinian (*M. cochleata/S. fluegeli* Rad. Subz.), x 150.

PLATE 28

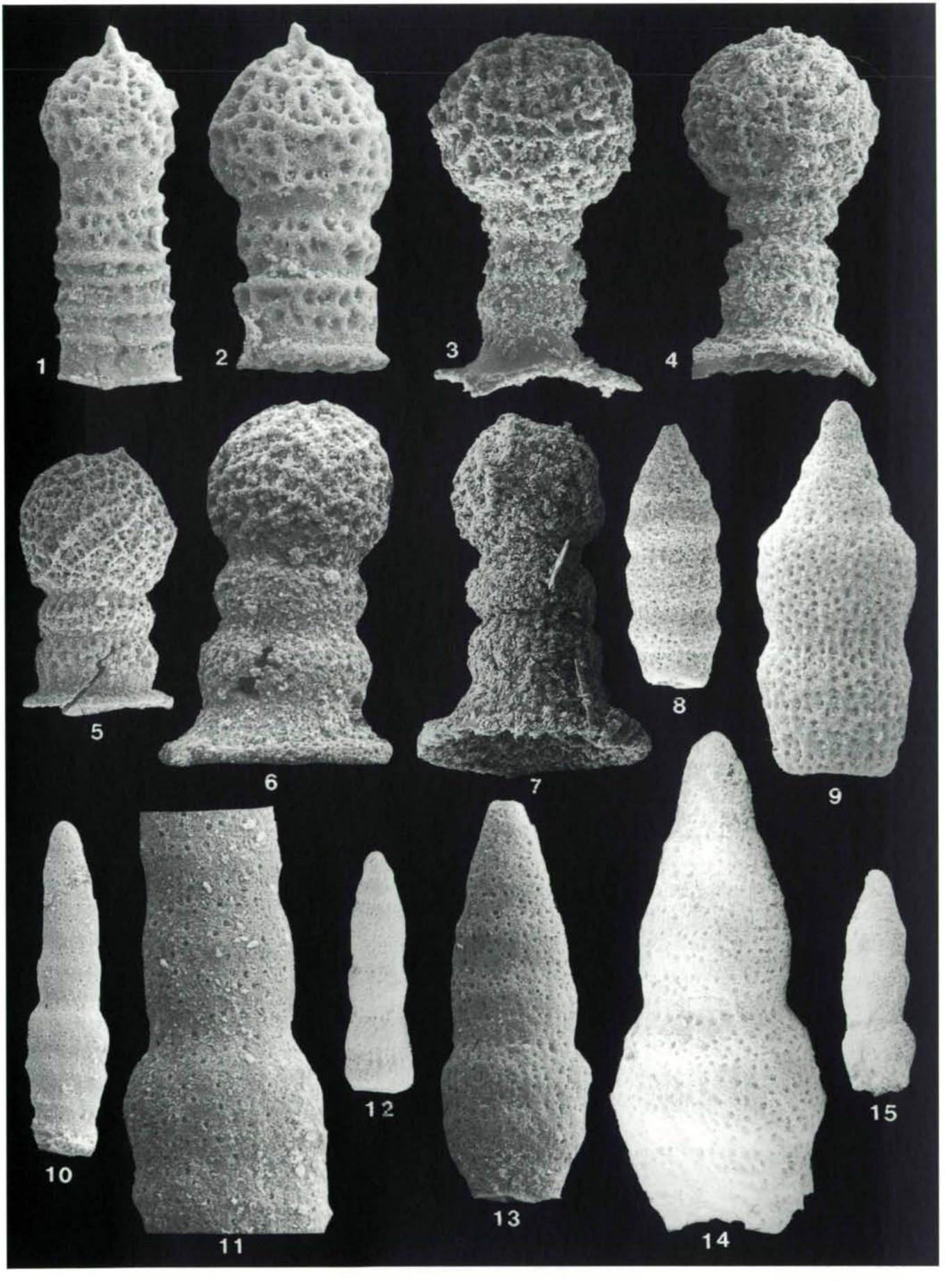

PLATE 29

Scanning electron micrographs of **Nassellaria**-Family **Canoptidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Canoptum rhaeticum*** KOZUR & MOSTLER
Sample no. 98-UKT-10, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 2 ***Canoptum* sp. aff. *C. unicum*** PESSAGNO & WHALEN
Sample no. 98-UKT-12, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 3-5 ***Japonocampe nova*** (YAO) Group
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
3. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
4. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
5. Specimen with very broad circumferential ridges, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 300,

Figure 6 Transional form between ***Japonocampe*** and ***Pachus***.
Although the general outline of the form are similar to *Japonocampe*, nodes on the circumferential ridge at medial part have a resemblance to *Pachus*, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 7 ***Pachus firmus*** BLOME
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 8 ***Pachus longinquus*** BLOME
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 9-12 ***Pachus multinodosus*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
9. Holotype, sample no. 97-UKT-133, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 300,
10. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
11. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
12. Paratype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 300.

PLATE 29

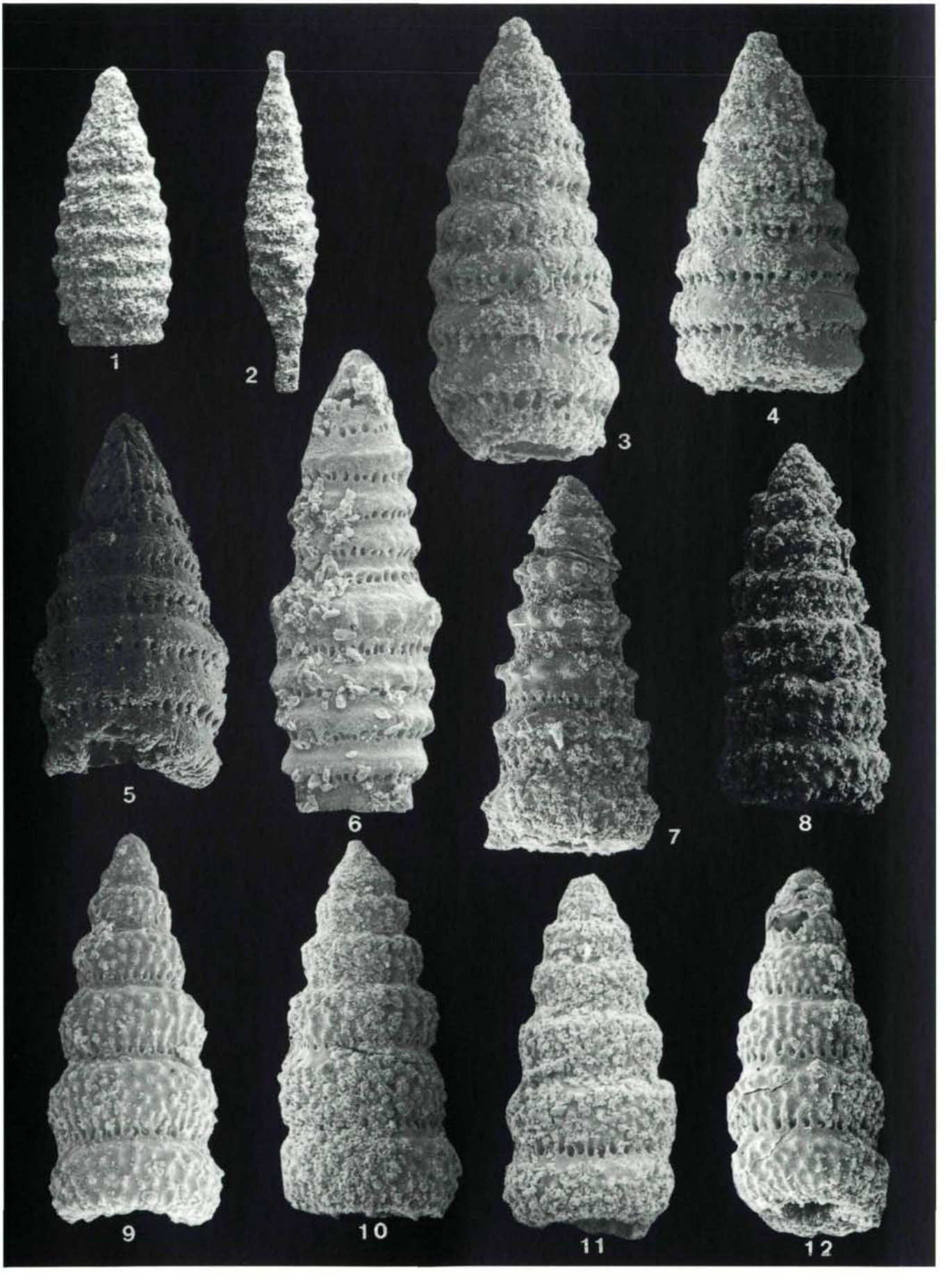

PLATE 30

Scanning electron micrographs of **Nassellaria**-Family **Deflandrecyrtiidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Deflandrecyrtium breviora*** (SUGIYAMA) n. comb.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
1. Sample no. 98-UKT-17, Rhaetian, x 150,
2. Sample no. 98-UKT-16, Rhaetian, x 200.

Figure 3 ***Deflandrecyritium curvatum*** (KOZUR & MOSTLER)
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 250.

Figures 4-6 ***Deflandrecyrtium inaquiporatum*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Holotype, side view, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Paratype, view from apical side, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 147,
6. Side view, same as fig. 5, x 200.

Figures 7-8 ***Deflandrecyrtium ithacanthum*** (SUGIYAMA) n. comb.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,.
7. Sample no. 98-UKT-18, Rhaetian, x 200.
8. Sample no. 96-UKT-476, Rhaetian, x 200.

Figures 9-10 ***Deflandrecyrtium parvus*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
9. Holotype, side view, sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py, x 200,
10. Paratype, side view, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 11-13 ***Deflandrecyrtium pessagnoi*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
11. Holotype, side view, sample no. 97-UKT-133, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200,
12. Paratype, view from apical side, sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 200,
13. Paratype, side view, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 30

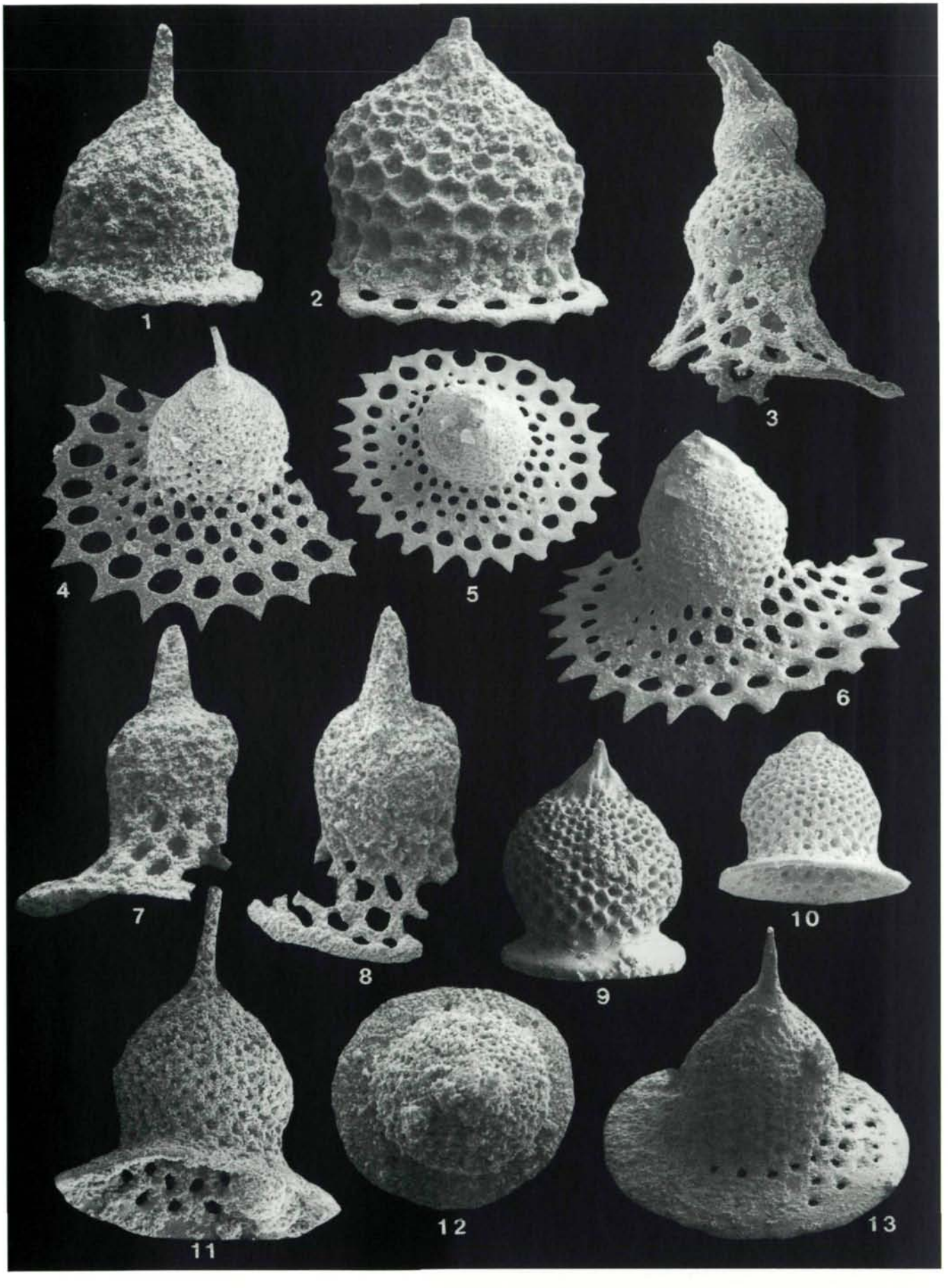

PLATE 31

Scanning electron micrographs of **Nassellaria**-Family **Deflandrecyrtiidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Deflandrecyrtium takemurai*** (YEH & CHENG) n. comb.
Sample no. 98-UKT-19, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 150.

Figures 2-3 ***Deflandrecyrtium tegumentiformis*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
2. Holotype, side view, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
3. Paratype, view from apical side, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 4 ***Deflandrecyrtium* ? sp. A**
View from apical side, sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 5-6 ***Haeckelicyrtium subcircularis*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
5. Holotype, side view, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
6. Paratype, view from apical side, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 7 ***Deflandrecyrtium* sp. B**
View from apical side, sample no. 98-UKT-48, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 8-10 ***Tricornicyrtium dikmetasensis*** n. gen., n. sp.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
8. Holotype, sample no. 98-UKT-19, Rhaetian, x 300,
9. Paratype, sample no. 98-UKT-16, Rhaetian, x 300,
10. Paratype, sample no. 98-UKT-18, Rhaetian, x 200.

PLATE 31

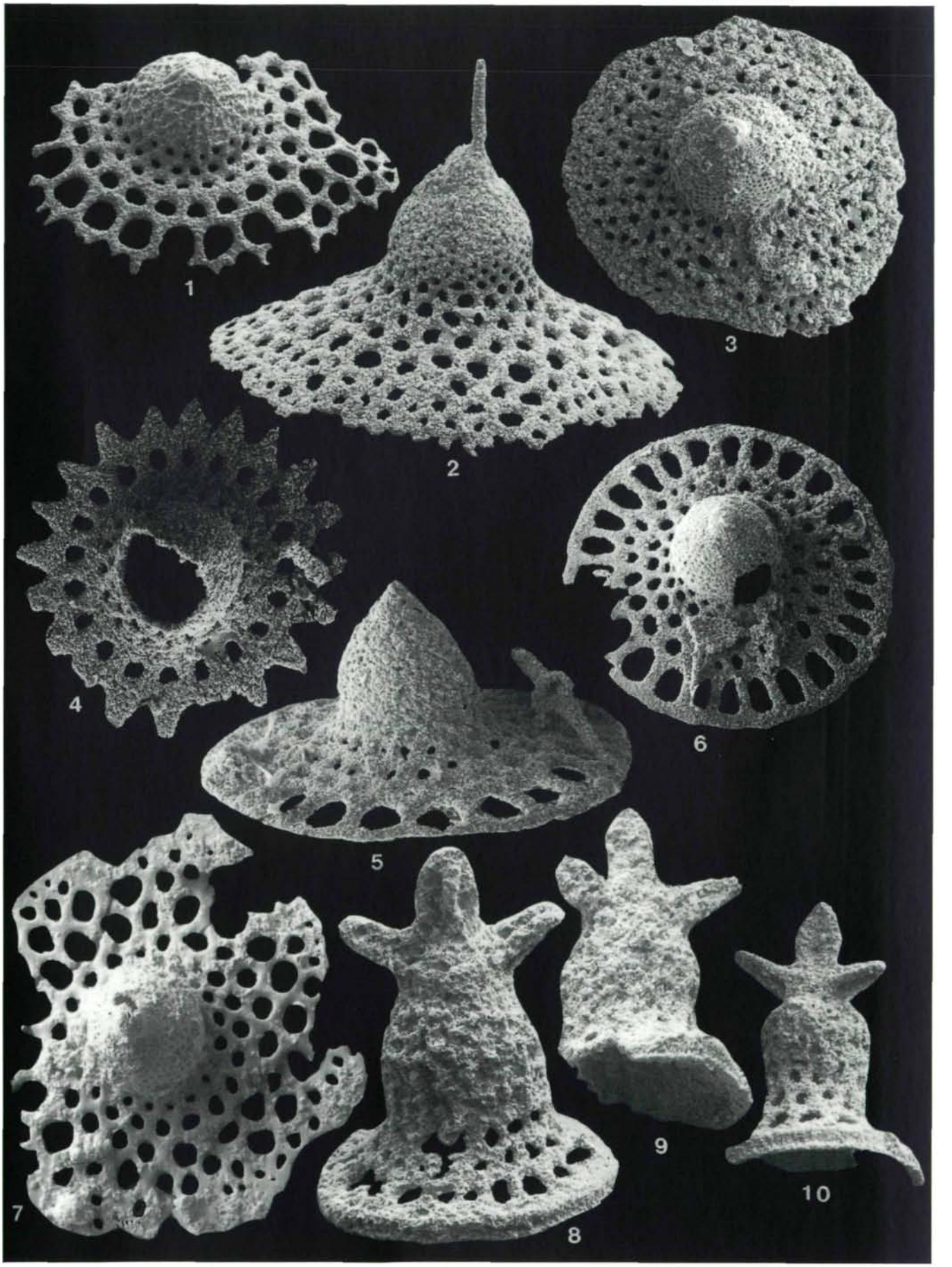

PLATE 32

Scanning electron micrographs of **Nassellaria**-Family **Hinedorcidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3 ***Alatipicapora gediki*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
2. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
3. Paratype, sample no. 98-UKT-51, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figure 4 ***Alatipicapora* sp. A**

Sample no. 98-UKT-61, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 5-6 ***Hinedorcus gibber*** n. sp.

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

5. Holotype, sample no. 96-UKT-531, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 400,
6. Paratype, sample no. 96-UKT-533, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 500.

Figures 7, 11 ***Picapora elegantissima*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

7. Holotype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 200,
11. Paratype, sample no. 98-UKT-51, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 200.

Figures 8-9 ***Picapora robusta*** KOZUR & MOSTLER

Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe,

8. Sample no. 96-UKT-707, middle Carnian, x 300,
9. Sample no. 96-UKT-707, middle Carnian, x 200.

Figure 10 ***Picapora* sp. aff. *P. robusta*** KOZUR & MOSTLER

Sample no. 98-UKT-41, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 300.

PLATE 32

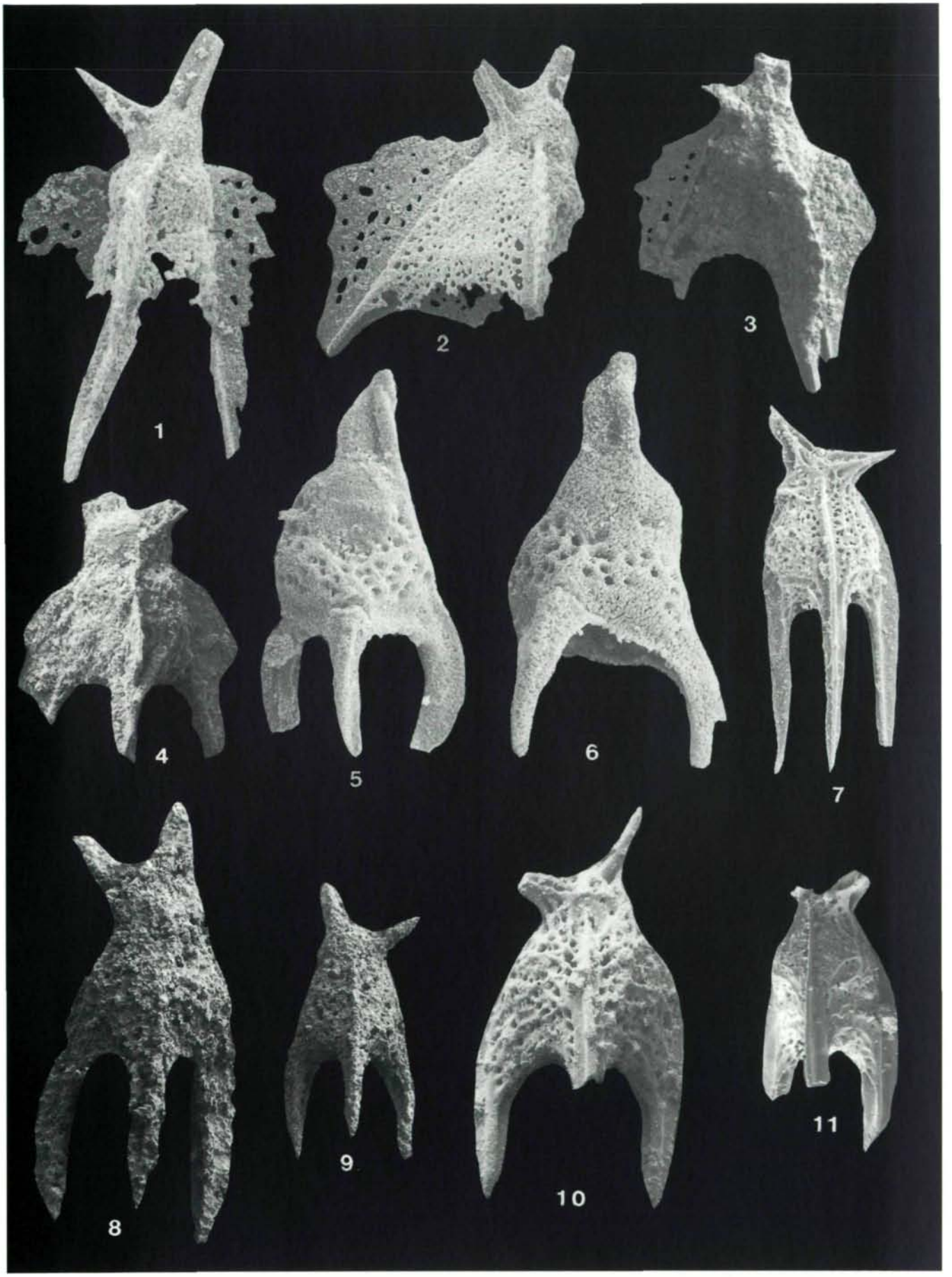

PLATE 33

Scanning electron micrographs of **Nassellaria**-Family **Livarellidae, Nakasekoellidae** and **Neoscidiocapsidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Livarella densiporata*** KOZUR & MOSTLER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
1. Sample no. 96-UKT-476, Rhaetian, x 200,
2. Sample no. 98-UKT-10, Rhaetian, x 200.

Figures 3-6 ***Livarella magna*** n. sp.
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
3. Holotype, sample no. 96-UKT-476, Rhaetian, x 200,
4. Paratype, sample no. 96-UKT-476, Rhaetian, x 200,
5. Paratype, sample no. 96-UKT-476, Rhaetian, x 150,
6. Paratype, sample no. 96-UKT-476, Rhaetian, x 150.

Figure 7 ***Livarella valida*** YOSHIDA
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 8-9 ***Nakasekoellus inkensis*** KOZUR
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
8. Sample no. 98-UKT-51, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 500,
9. Sample no. 98-UKT-41, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 500.

Figures 10 ***Nakasekoellus pessagnoi*** (NAKASEKO & NISHIMURA)
Sample no. 98-UKT-59, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 11 ***Squinabolella*** **sp. aff.** ***S. causia*** CARTER
Sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 12-13 ***Squinabolella ? trispinosa*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
12. Sample no. 98-UKT-20, Rhaetian, x 200,
13. Sample no. 98-UKT-20, Rhaetian, x 200.

PLATE 33

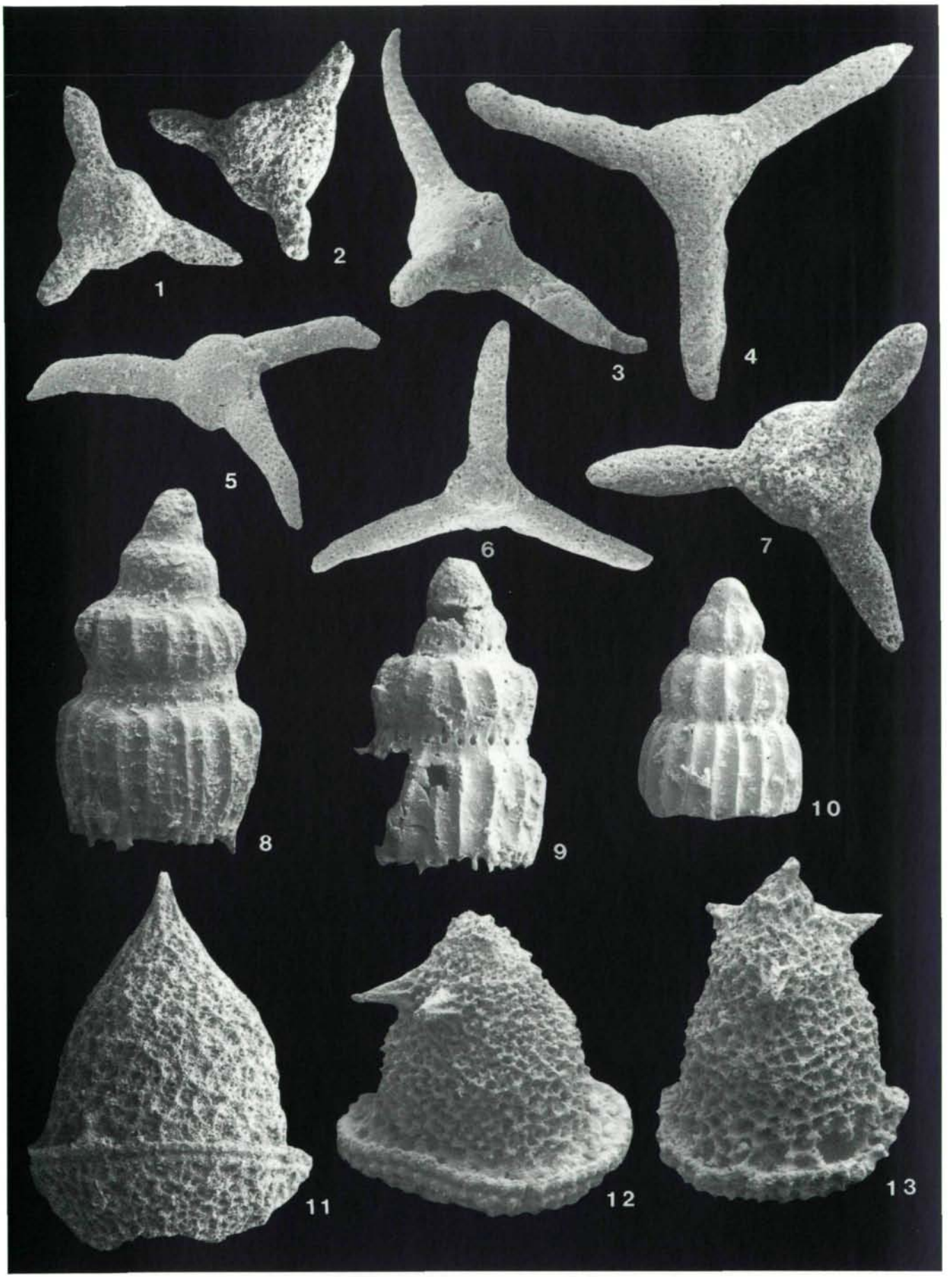

PLATE 34

Scanning electron micrographs of **Nassellaria**-Family **Neoscidiocapsidae, Planispinocyrtiidae** and **Pseudosaturniformidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Citriduma asteroides*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
1. Sample no. 98-UKT-17, Rhaetian, x 150,
2. Sample no. 96-UKT-476, Rhaetian, x 150.

Figure 3 ***Praecitriduma canthofistula*** CARTER
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 4 ***Spinotriassocampe carnica*** KOZUR & MOSTLER
Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappes, middle Carnian, x 200.

Figures 5-6 ***Spinotriassocampe longobardica*** KOZUR & MOSTLER
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
5. Sample no. 96-UKT-532, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 500,
6. Sample no. 96-UKT-532, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 500.

Figures 7-10 ***Pseudosaturniforma carnica*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,.
7. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
8. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
9. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
10. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

PLATE 34

PLATE 35

Scanning electron micrographs of **Nassellaria**-Family **Pseudodictyomitridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Corum ? delgado*** SUGIYAMA
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Sample no. 96-UKT-559, early Carnian (*T. kretaensis* Rad. Z.), x 200,
2. Sample no. 96-UKT-558, early Carnian (*T. kretaensis* Rad. Z.), x 250.

Figures 3-5 ***Corum fusiformis*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
3. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
4. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 400,
5. Paratype, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 6 ***Corum candidum*** YEH
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 7-9 ***Corum kraineri*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Holotype, sample no. 96-UKT-580, early Carnian, x 250,
8. Detail of the medial part of the test, same as fig. 7, x 500,
9. Paratype, sample no. 96-UKT-576, early Carnian, x 250.

Figures 10-11 ***Corum regium*** BLOME
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
11. Sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 12 ***Corum speciosum*** BLOME
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 13-14 ***Corum sugozuensis*** n. sp.
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
13. Holotype, sample no.96-UKT-547, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300,
14. Paratype, sample no.96-UKT-528, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300.

PLATE 35

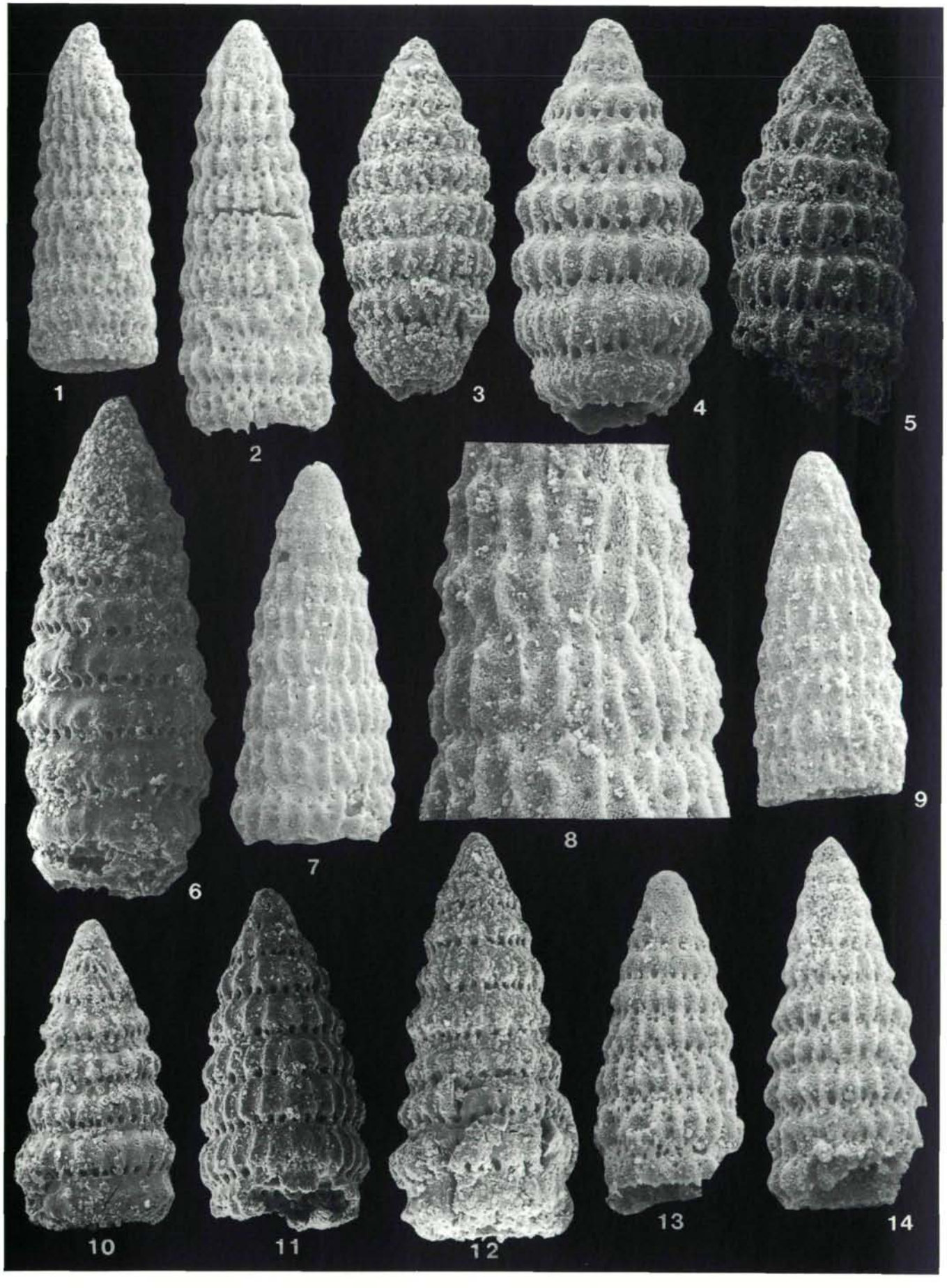

PLATE 36

Scanning electron micrographs of **Nassellaria**-Family **Pseudodictyomitridae** and **Ruesticyrtiidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-5 ***Kozuricyrtium carinatus*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
3. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 6-8 ***Kozuricyrtium pulchra*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

6. Holotype, sample no. 97-UKT-128,.early Norian (*E. abneptis* Con. Z.), Py., x 200,
7. Paratype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 250,
8. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 250.

Figures 9-12 ***Pararuesticyrtium ? anatoliaensis*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

9. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 250,
10. Paratype, sample no. 97-UKT-133, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 300,
11. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300.
12. Detail of the medial part of the test, same as fig. 11, x 1000,

Figures 13-14 ***Pararuesticyrtium mediobulbosum*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

13. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
14. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 15 ***Pararuestiyrtium*** **sp. A**

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

PLATE 36

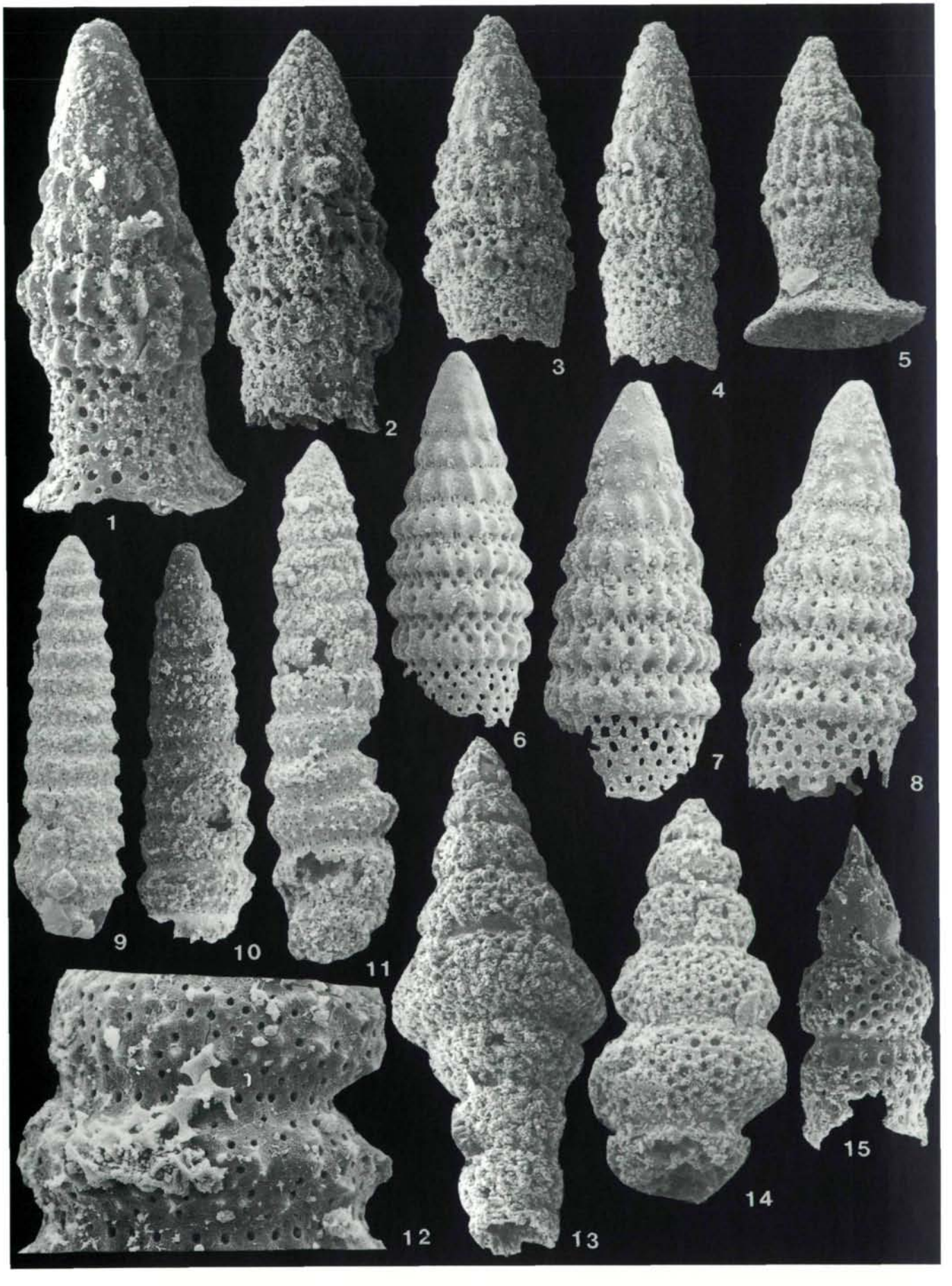

PLATE 37

Scanning electron micrographs of **Nassellaria**-Family **Sanflippoellidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3, 5 ***Annulopoulpus antalyaensis*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
3. Paratype, sample no. 97-UKT-128, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 4 ***Annulopoulpus reticulatus*** KOZUR & MOSTLER
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 6 ***Hozmadia spinosa*** KOZUR & MOSTLER
Sample no. 96-UKT-531, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 500.

Figures 7-9 ***Neopyletonema procera*** SUGIYAMA
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 350,
8. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
9. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 10-11 ***Parapoulpus oertlii*** KOZUR & MOSTLER
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Sample no. 98-UKT-41, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 300,
11. Sample no. 98-UKT-67, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 12 ***Parapoulpus* sp. A**
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 150.

PLATE 37

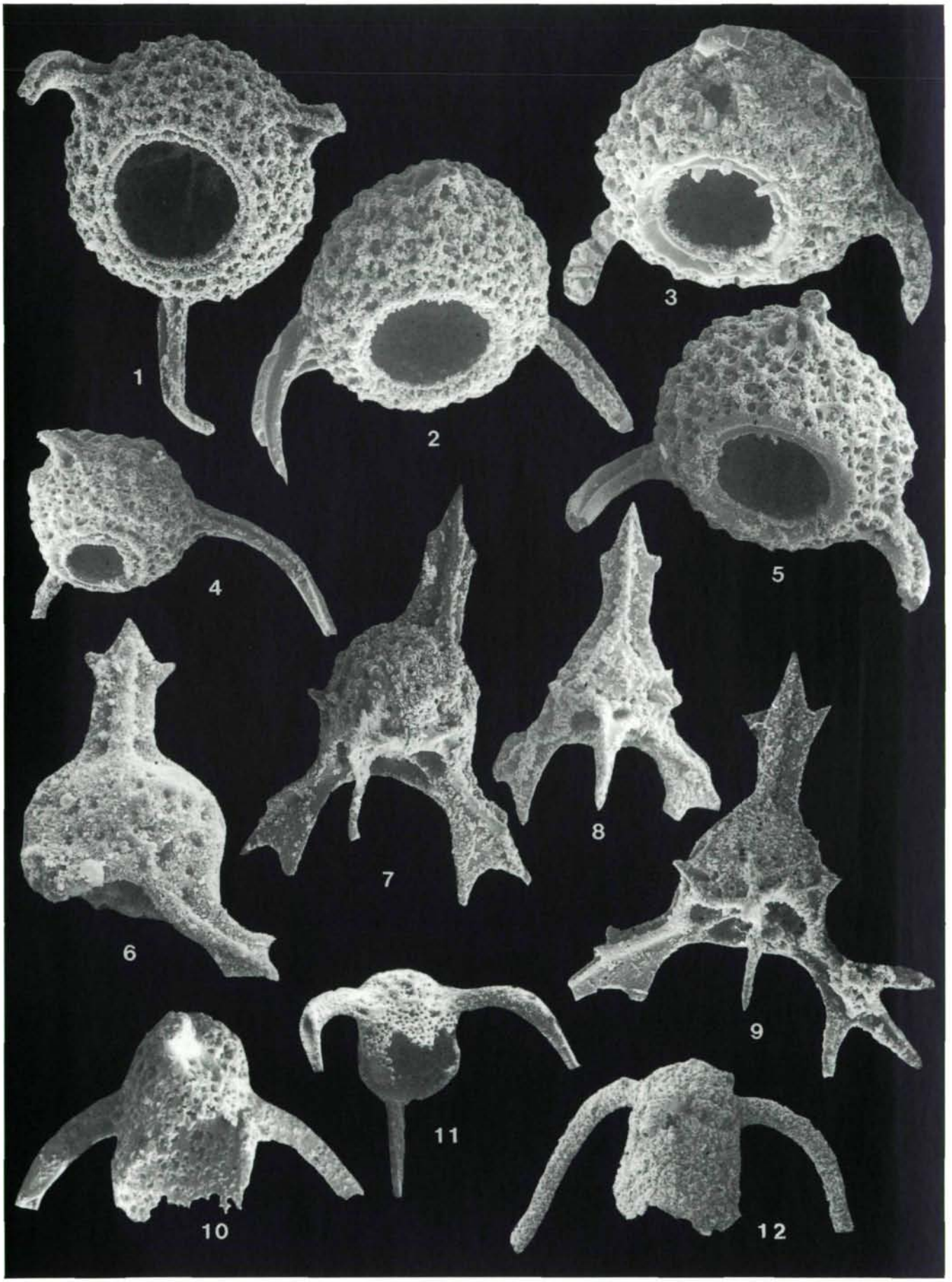

PLATE 38

Scanning electron micrographs of **Nassellaria**-Family **Sanflippoellidae** and **Silicarmigeridae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Poulpus curvispinus cuvispinus*** DUMITRICA, KOZUR & MOSTLER
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Sample no. 96-UKT-526, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300,
2. Sample no. 94-UKT-42, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 150.

Figures 3-4 ***Poulpus piabyx*** DE WEVER
3. Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figure 5 ***Poulpus transitus*** KOZUR & MOSTLER
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 6-8 ***Sanflippoella lengeranlii*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 300,
7. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
8. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 9 ***Spinopoulpus noricus*** KOZUR & MOCK
Sample no. 98-UKT-61, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 10 ***Veghia*** **sp. aff.** ***V. sulovensis*** KOZUR & MOCK
Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 11 ***Veghia sulovensis*** KOZUR & MOCK
Sample no. 98-UKT-61, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 12-13 ***Silicarmiger curvatus*** (KOZUR & MOSTLER)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
12. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
13. Sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 14-15 ***Silicarmiger latus latus*** KOZUR & MOSTLER
Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,
14. Sample no. 96-UKT-520, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 300.
15. Sample no. 96-UKT-521, late Ladinian (*M. cochleata/ ? P. priscus* Rad. Subz.), x 200.

PLATE 38

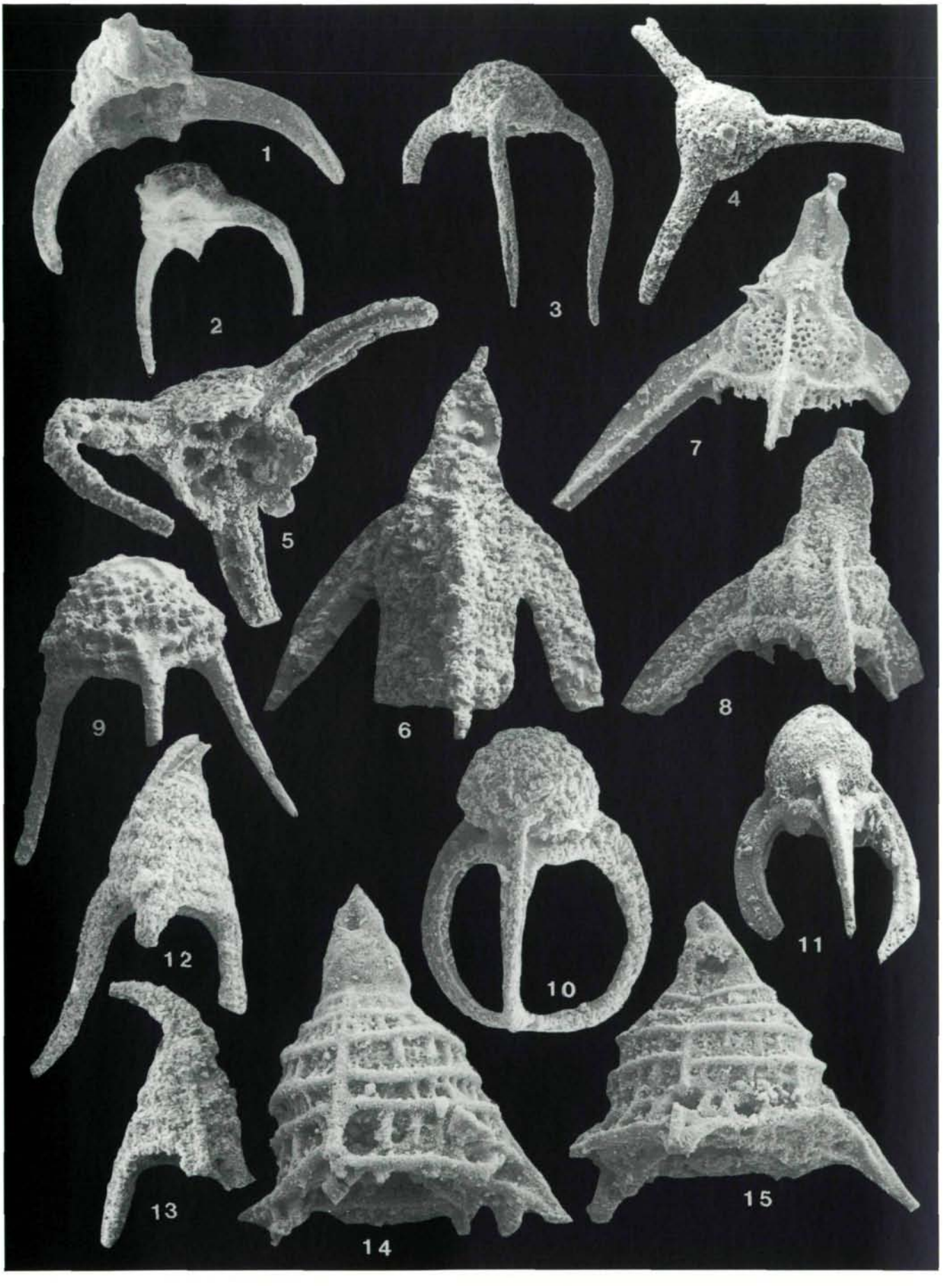

PLATE 39

Scanning electron micrographs of **Nassellaria**-Family **Syringocapsidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-3 ***Podobursa akayi*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 200,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
3. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 4-5 ***Podobursa galeata*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

4. Holotype, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Paratype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figures 6-8 ***Podobursa primitiva*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

6. Holotype, sample no. 98-UKT-59, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
8. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 9-11 ***Podobursa turriformis*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

9. Holotype, sample no. 97-UKT-123, early Norian (*E. abneptis* Con. Z.), Py., x 300,
10. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
11. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 39

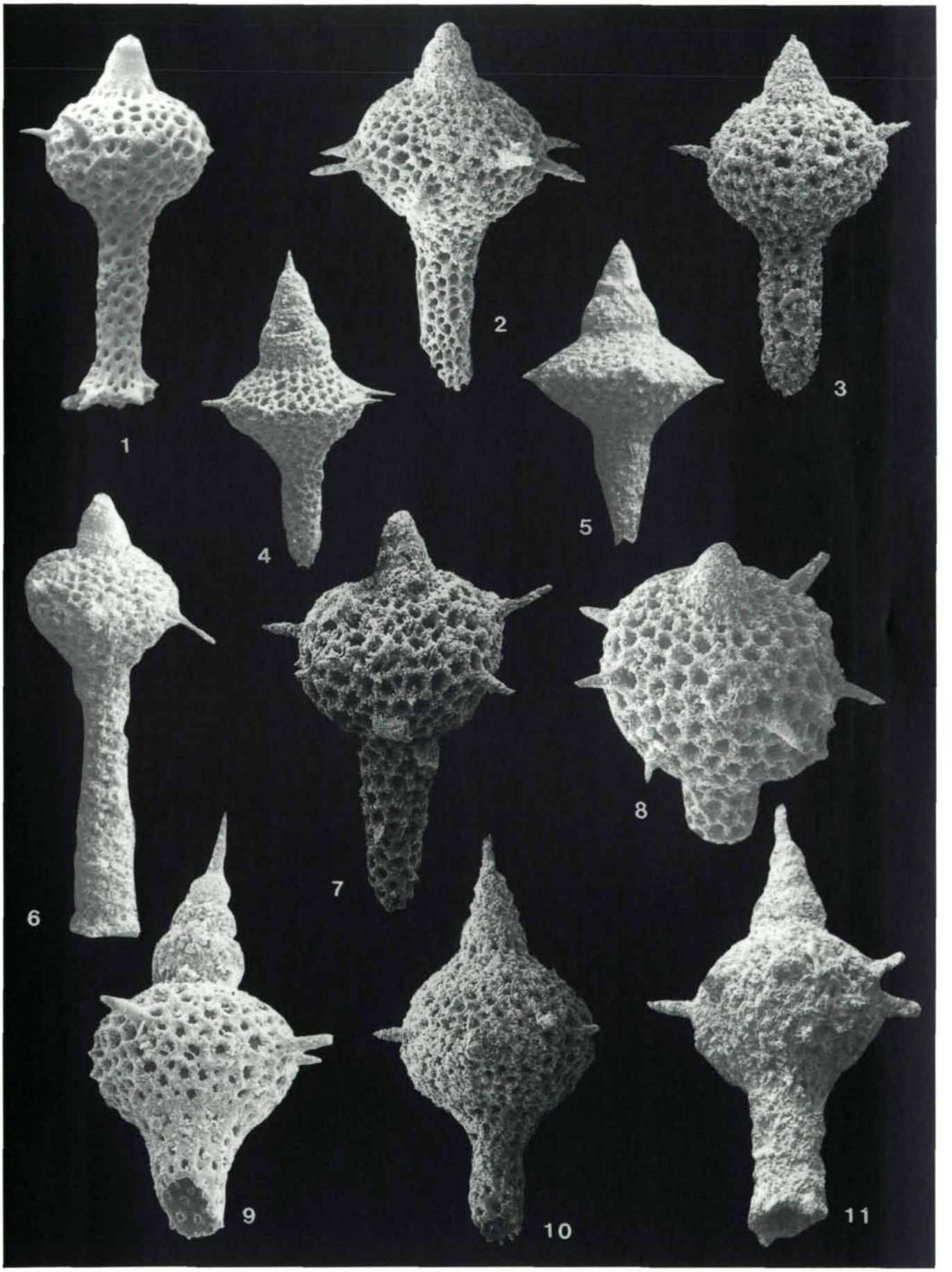

PLATE 40

Scanning electron micrographs of **Nassellaria**-Family **Syringocapsidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Podobursa yazgani*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
1. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 250,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figure 3 ***Podobursa* sp. A**
Sample no. 98-UKT-61, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 4-5 ***Syringocapsa extansa*** n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
5. Paratype, sample no. 96-UKT-676, early Norian (*E. triangularis* Con. Z.), x 200.

Figure 6 ***Syringocapsa rhaetica*** KOZUR & MOSTLER
Sample no. 98-UKT-14, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 7-8 ***Syringocapsa turgida*** BLOME
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 300,
8. Sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 9 ***Syringocapsa* sp. A**
Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figure 10 ***Syringocapsa* sp. B**
Sample no. 98-UKT-51, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 300.

PLATE 40

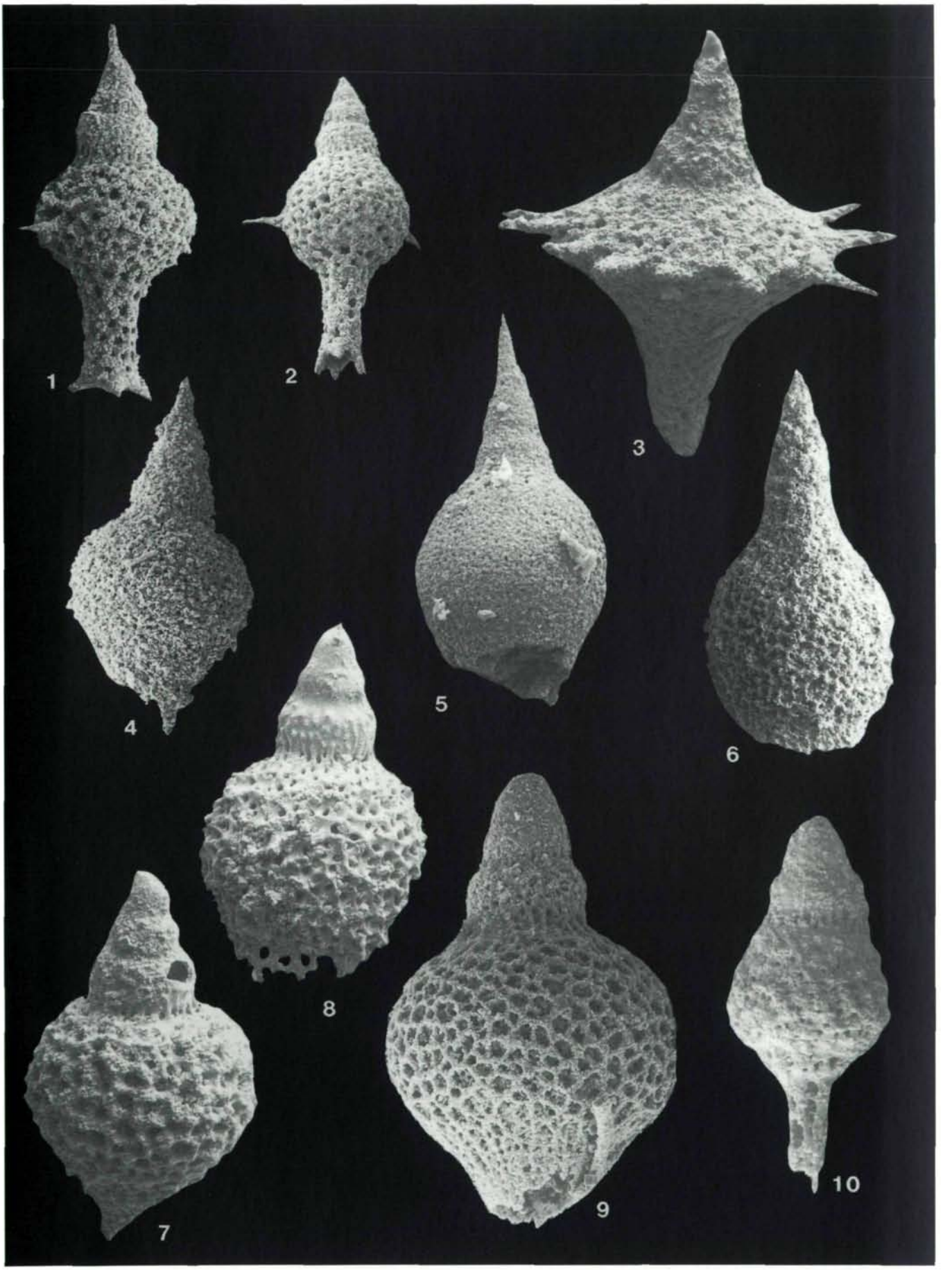

PLATE 41

Scanning electron micrographs of **Nassellaria**-Family **Triassocampidae** and **Unumidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-2 ***Annulotriassocampe baldii*** KOZUR Group

1. Sample no. 96-UKT-571, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian (*T. kretaensis* Rad. Z.), x 290,
2. Sample no. 97-UKT-138, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (E.abneptis Con. Z.), Py., x 300.

Figures 3-6 ***Annulotriassocampe multisegmantatus*** n. sp.

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes,

3. Holotype, sample no. 96-UKT-530, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
4. Paratype, sample no. 96-UKT-560, early Carnian (*T. kretaensis* Rad. Z.), x 240,
5. Paratype, specimen with slightly defected medial part, sample no. 96-UKT-544, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200,
6. Paratype, sample no. 96-UKT-547, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 200.

Figure 7 ***Annulotriassocampe proprium*** (BLOME)

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 400

Figure 8 ***Annulotriassocampe sulovensis*** (KOZUR & MOCK)

Sample no. 96-UKT-584, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian, x 250.

Figure 9 ***Annulotriassocampe* ? sp. A**

Sample no. 97-UKT-120, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian/earliest Norian (*E. primitia* Con. Z.), Py., x 320.

Figure 10 ***Triassocampe scalaris*** DUMITRICA,KOZUR & MOSTLER s. l.

Sample no. 96-UKT-521, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (M.cochleata/ ? *P. priscus* Rad. Subz.), x 200.

Figures 11-15 ***Praeprotunuma antiqua*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

11. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 400,
12. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300,
13. Paratype, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 400,
14. Paratype, inner structure of the form, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 500,
15. Paratype, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 400.

PLATE 41

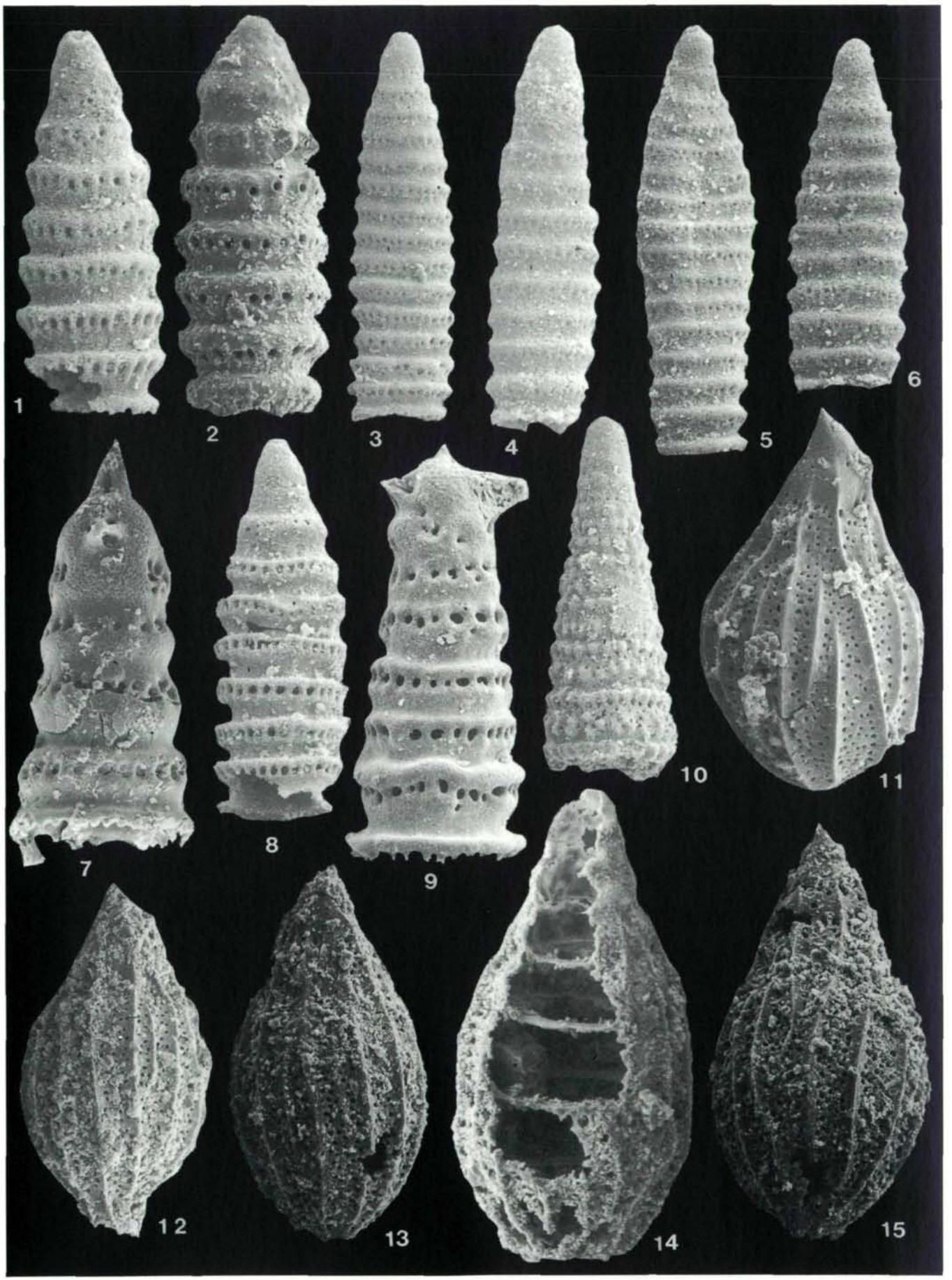

PLATE 42

Scanning electron micrographs of **Nassellaria**-Family **Xiphothecidae** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-5 ***Senelella triassica*** n. gen., n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 120,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
3. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
4. Paratype, note the segment like ocurrence between first and second post-abdominal segment, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Paratype, same feature as fig, 4, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 6-7 ***Xiphotheca irregularis*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

6. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 15,.
7. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 8-11 ***Xiphotheca pseudolonga*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

8. Holotype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200,
9. Same as fig. 8, x 500, detail of the apical part,
10. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200,
11. Paratype, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 150.

Figure 12 ***Xiphotheca* sp. cf. *X. karpenissionensis*** DE WEVER

Sample no. 96-UKT-707, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 200.

Figures 13-14 ***Xiphotheca longa*** KOZUR & MOCK

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

13. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
14. Sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 15-18 ***Xiphotheca rugosa*** BRAGIN

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

15. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 100,
16. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
17. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 150,
18. Detail of the apical part, same as fig. 17, x 500.

PLATE 42

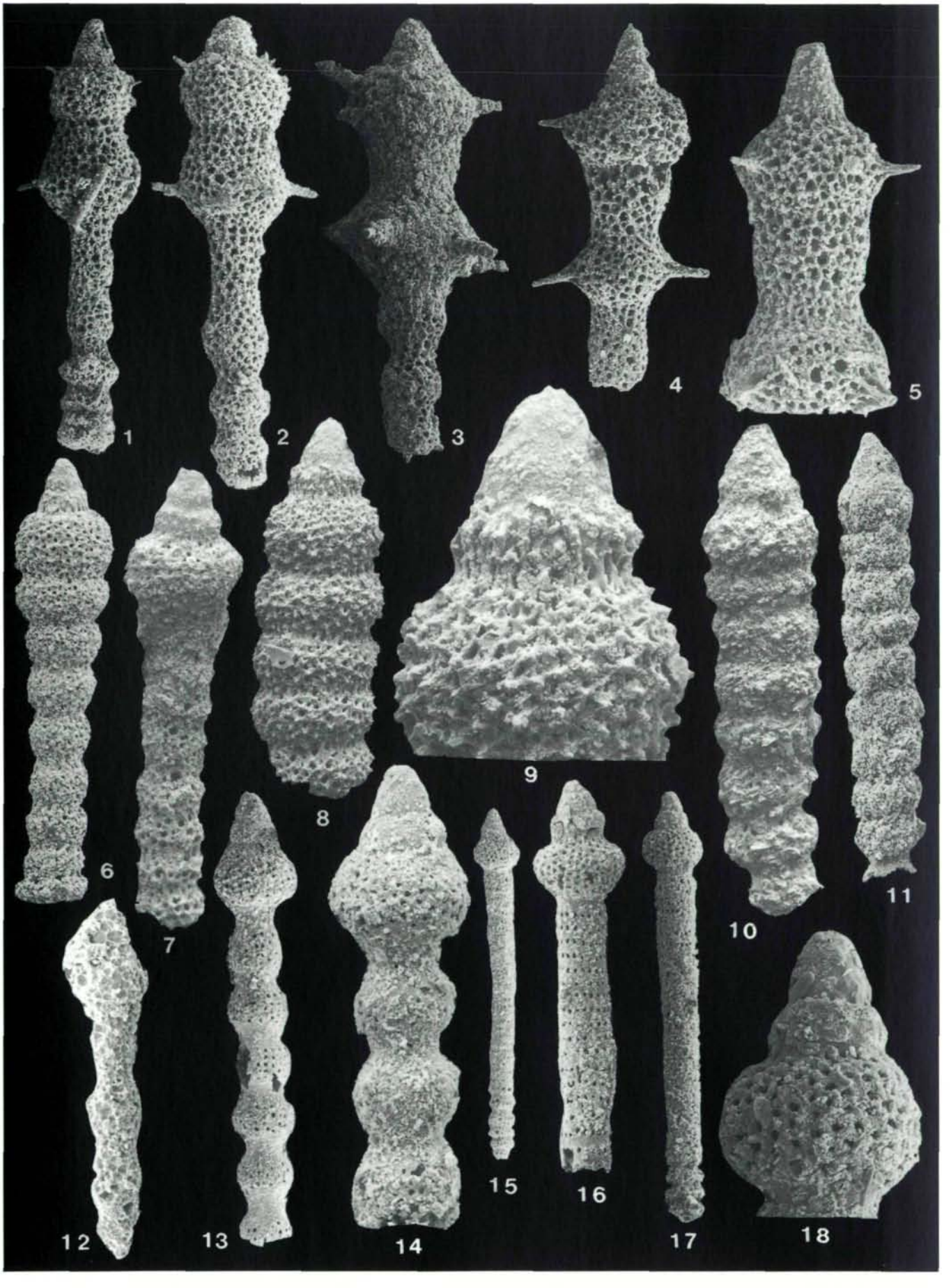

PLATE 43

Scanning electron micrographs of **Nassellaria**-Family **Xiphothecidae** and **Nassellaria Incertae Sedis** from Taurus Mountains and Ankara region. Py.: Pyritized Radiolaria.

Figures 1-5 ***Xiphotheca rugosa*** BRAGIN

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
2. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
3. Specimen with rudimentary apical horn, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
5. Detail of the distal globose post-abdominal segments, same as fig. 4, x 500.

Figures 6-8 ***Xiphotheca ? transitus*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

6. Holotype, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 150,
7. Paratype, sample no. 98-UKT-62, early Norian (*E. abneptis* Con. Z.), Py., x 100,
8. Paratype, sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 9-11 ***Bipedis acrostylus*** BRAGIN

9. Sample no. 94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian, x 200,
10. Sample no. 94-B-1-7, Ankara Ophiolitic Melange, Ankara, late Norian, x 200,
11. Sample no. 98-UKT-19, Dikmetas Measured Section from Cataltepe Nappe, Antalya Nappes, Rhaetian, x 200.

Figure 12 ***Canesium lentum*** BLOME

Sample no. 97-UKT-137, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, early Norian (*E. abneptis* Con. Z.), Py., x 500.

Figures 13-14 ***Castrum perornatum*** BLOME

Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes.

13. Sample no. 96-UKT-560, early Carnian (*T. kretaensis* Rad. Z.), x 300,
14. Sample no. 97-UKT-531, late Ladinian (*M. cochleata/ S. fluegeli* Rad. Subz.), x 300.

Figure 15 ***Enoplocampe*** **sp. A**

Sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

PLATE 43

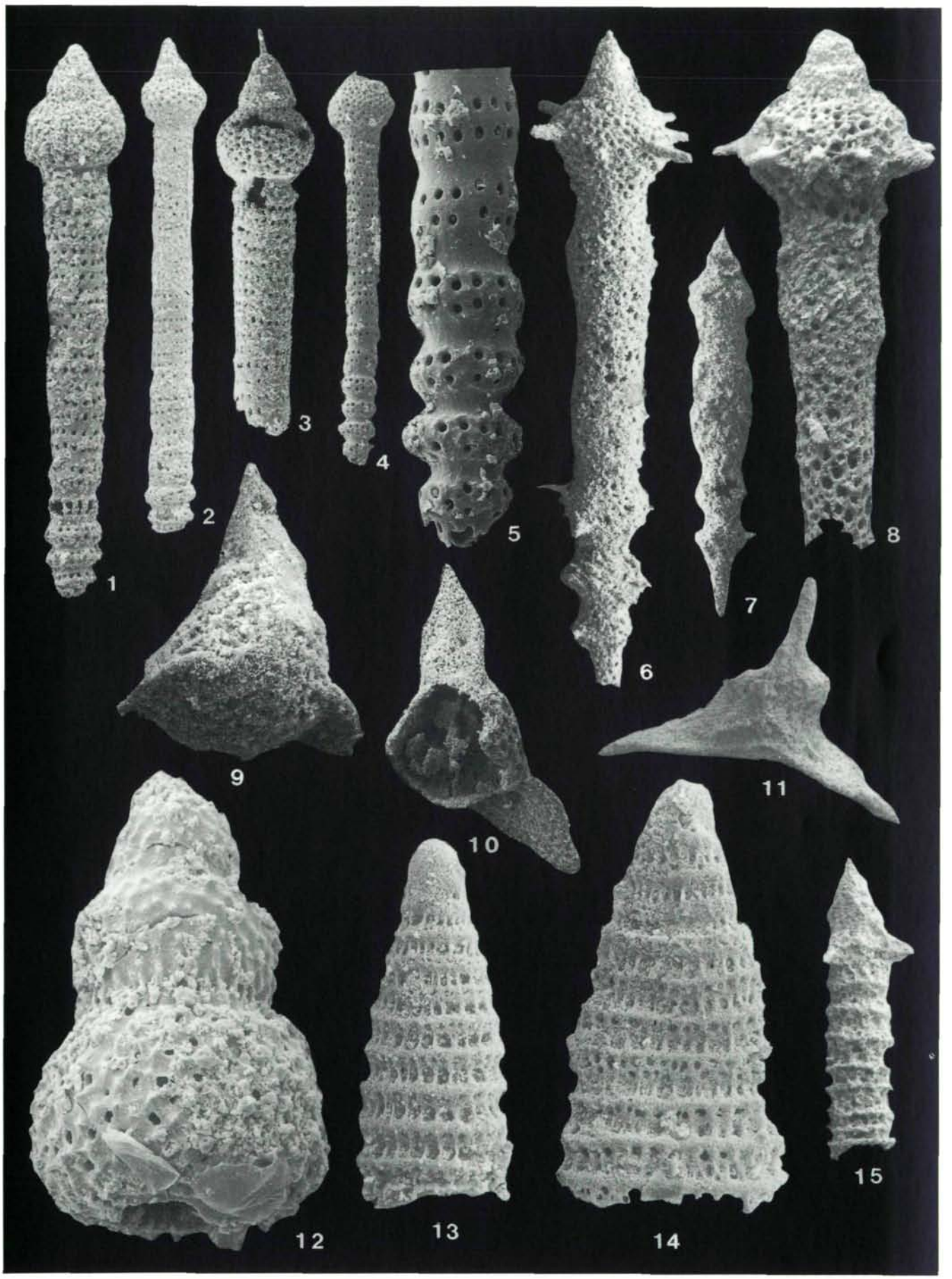

PLATE 44

Scanning electron micrographs of **Nassellaria Incertae Sedis** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Globolaxtorum cristatum*** CARTER
Sample no. 98-UKT-10, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 2 ***Globolaxtorum hullae*** (YEH & CHENG)
Sample no. 98-UKT-16, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 3 ***Globolaxtorum* ? sp. A**
Sample no. 98-UKT-13, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 300.

Figure 4 ***Globolaxtorum* sp. B**
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 5 ***Globolaxtorum* sp. C**
Sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figure 6 ***Laxtorum capitaneum*** CARTER
Sample no. 98-UKT-12, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 7-9 ***Laxtorum perfectum*** CARTER
Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,
7. Sample no. 98-UKT-16, Rhaetian, x 150,
8. Sample no. 98-UKT-16, Rhaetian, x 200,
9. Sample no. 98-UKT-16, Rhaetian, x 200.

Figure 10 ***Laxtorum* sp. aff. *L. perfectum*** CARTER
Sample no. 98-UKT-18, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Rhaetian, x 200.

Figures 11-15 ***Mostlericyrtium sitepesiformis*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
11. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 130,
12. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
13. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 100,
14. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 100,
15. Paratype, note the distinctive vertical horn, sample no. 98-UKT-48, early Norian (*E. abneptis* Con. Z.), Py., x 500.

Figures 16-18 ***Mostlericyrtium striata*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
16. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
17. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
18. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 44

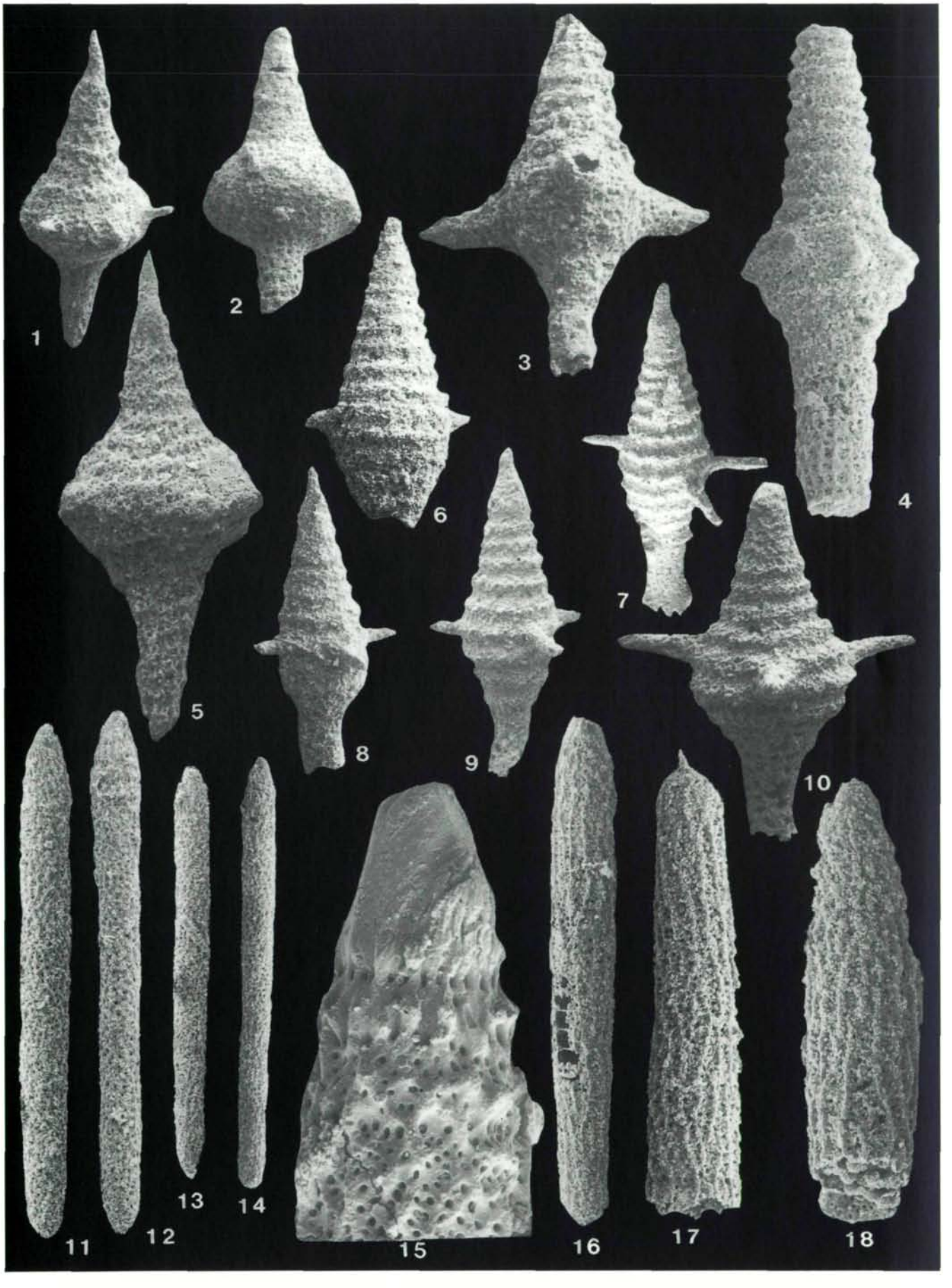

PLATE 45

Scanning electron micrographs of **Nassellaria Incertae Sedis** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figure 1 ***Multimonilis* sp. A**
Sample no. 96-UKT-520, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ ? *P. priscus* Rad. Subz.), x 300.

Figure 2 ***Multimonilis* sp. B**
Sample no. 94-UKT-42, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, late Ladinian (*M. cochleata*/ *S. fluegeli* Rad. Subz.), x 150.

Figure 3 ***Multimonilis* ? sp. C**
Sample no. 96-UKT-584, Sugozu Measured Section from the Alakircay Nappe of the Antalya Nappes, early Carnian, x 300.

Figures 4-5 ***Papiliocampe ovalis*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 400,
5. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 6-8 ***Papiliocampe tokerae*** n. gen., n. sp.
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
6. Holotype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 300,
7. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
8. Paratype, sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 400.

Figures 9-12 ***Trialatus praerobustus*** SUGIYAMA
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
9. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 150,
10. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
11. Sample no. 97-UKT-138, early Norian (*E. abneptis* Con. Z.), Py., x 200,
12. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

PLATE 45

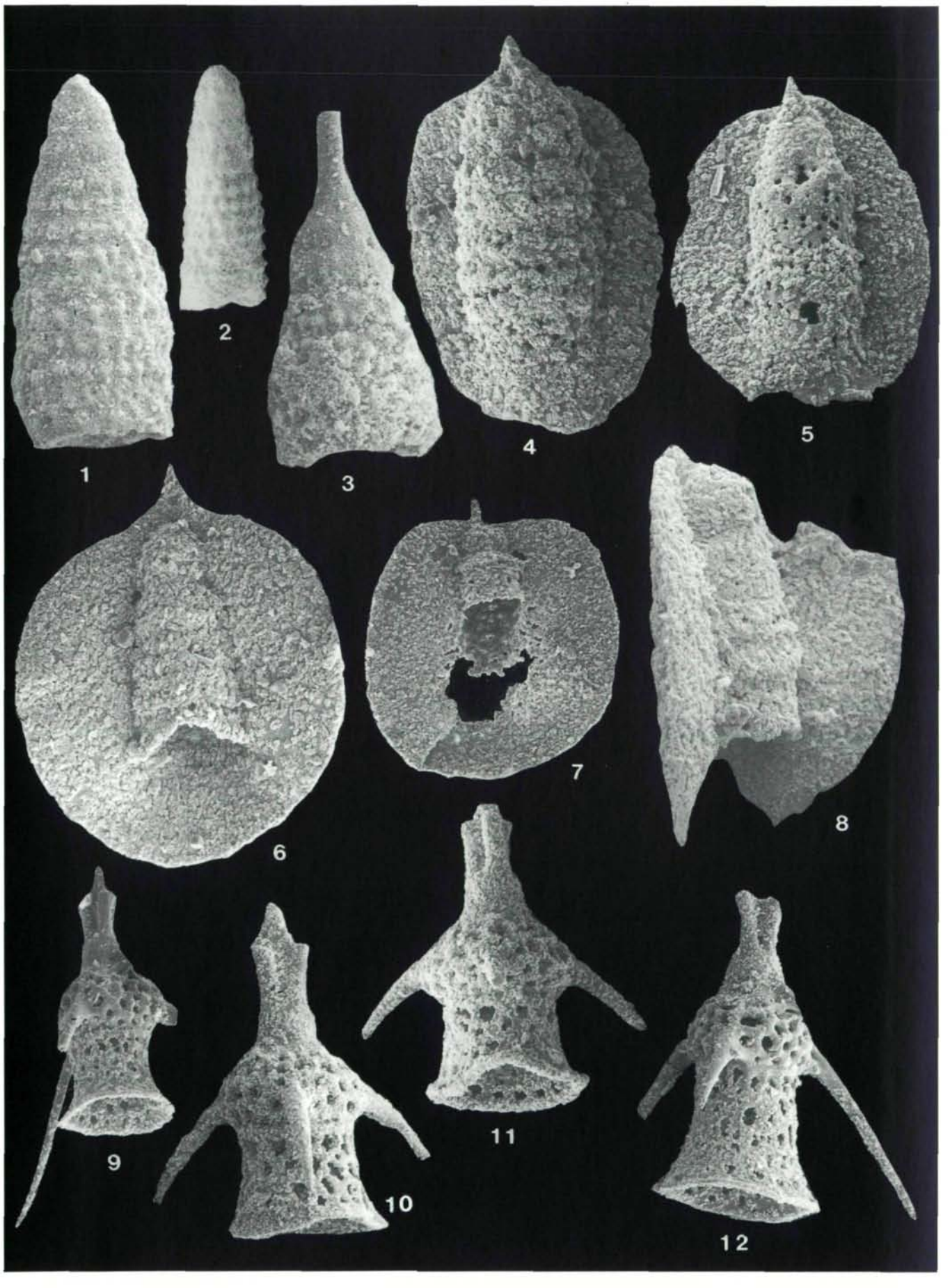

PLATE 46

Scanning electron micrographs of **Triassic Radiolaria-Nassellaria Incertae Sedis** and **Hettengian Radiolaria** from Taurus Mountains. Py.: Pyritized Radiolaria.

Figures 1-4 ***Trialatus procerus*** n. sp.

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

1. Holotype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
2. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
3. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200,
4. Paratype, sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 200.

Figures 5-6 **Nassellaria gen. and sp. indet. A**

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

5. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.
6. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 7-8 **Nassellaria gen. and sp. indet. B**

Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,

7. Sample no. 98-UKT-61, early Norian (*E. abneptis* Con. Z.), Py., x 200,
8. Sample no. 97-UKT-137, early Norian (*E. abneptis* Con. Z.), Py., x 300.

Figures 9-10 ***Parahsuum simplum*** YAO

Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes,

9. Sample no. 98-UKT-24, Hettengian, x 300,
10. Sample no. 98-UKT-24, Hettengian, x 300.

Figure 11 ***Pantanellium inornatum*** PESSAGNO & POISSON

Sample no. 98-UKT-24, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Hettengian, x 300.

Figure 12 ***Pseudoheliodiscus robustuspinosus*** KOZUR & MOSTLER

Sample no. 98-UKT-24, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Hettengian, x 200.

Figure 13 ***Droltus* sp. aff. *D. carinaspinosus*** KOZUR & MOSTLER

Sample no. 98-UKT-24, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Hettengian, x 300.

Figure 14 ***Dumitricaella pauliani*** DE WEVER

Sample no. 98-UKT-24, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, Hettengian, x 150.

PLATE 46

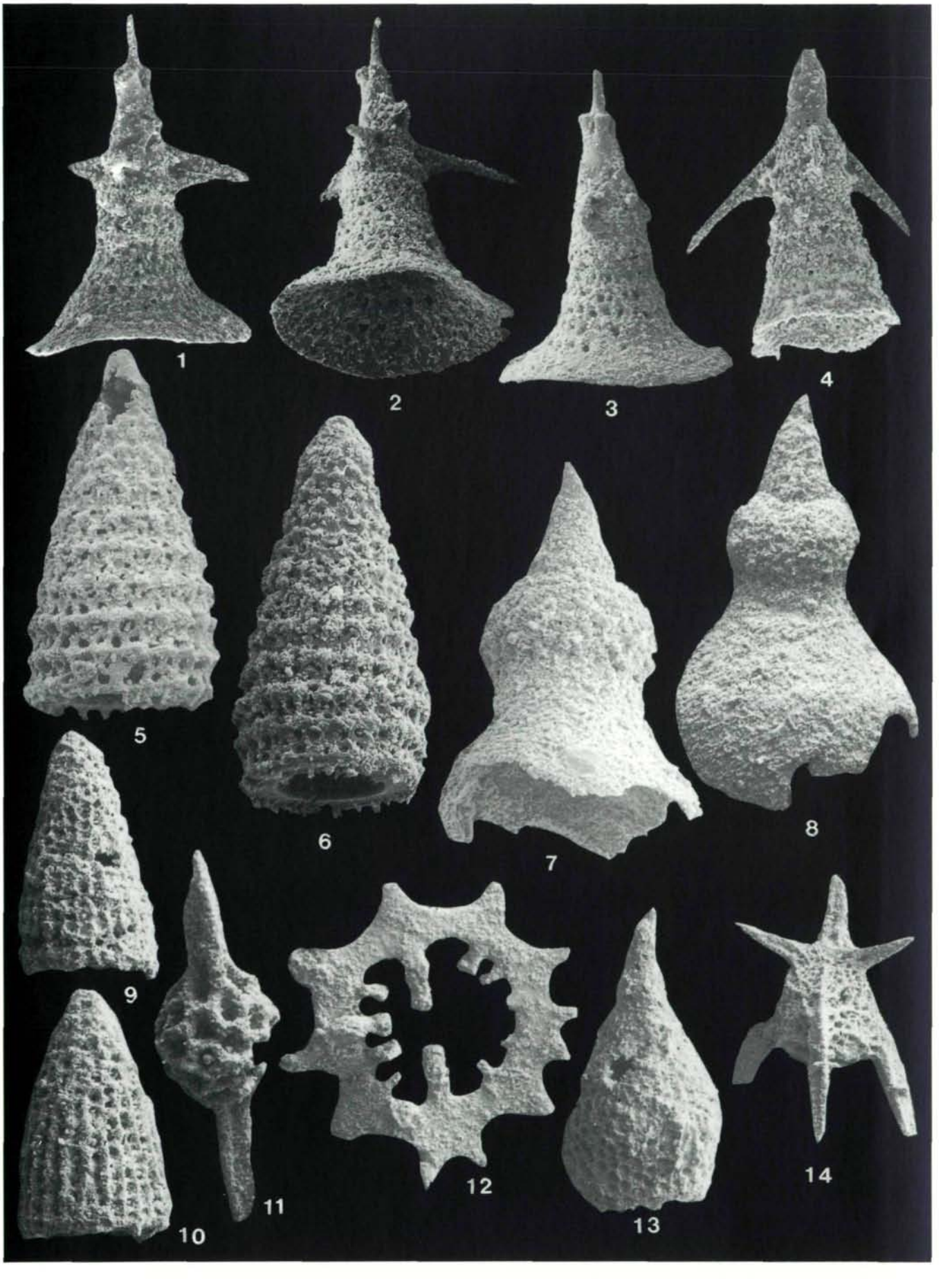

PLATE 47

Scanning electron micrographs of **conodonts** from Taurus Mountains.

Figure 1 ***Paragondolella polygnatiformis noah*** (HAYASHI)
Pa element, lateral view, sample no. 96-UKT-693, Haciyunuslar Measured Section from the Huglu Unit of the Beysehir-Hoyran Nappe, middle Carnian, x 100.

Figure 2 ***Gladigondolella* sp.**
Sb element, lateral view, sample no. 96-UKT-654.a, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, middle Carnian, x 100.

Figure 3 ***Epigondolella primitia*** MOSHER
Pa element, upper view, sample no. 98-UKT-40, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian- earliest Norian (*E. primitia* Con. Z.), x 100.

Figures 4-5 ***Epigondolella permica*** (HAYASHI)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
4. Pa element, upper view, sample no. 98-UKT-46, early Norian (*E. abneptis* Con. Z.), x 100,
5. Pa element, upper view, sample no. 97-UKT-119, latest Carnian-earliest Norian (*E. primitia* Con. Z.), x 100.

Figure 6 ***Epigondolella pseudoechinata*** KOZUR
Pa element, upper view, sample No. 97-UKT-136, Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes, latest Carnian-earliest Norian (*E. primitia* Con. Z.), x 100.

Figures 7-9 ***Epigondolella abneptis*** (HUCKERIEDE)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
7. Pa element, upper view, sample no. 98-UKT-46, early Norian (*E. abneptis* Con. Z.), x 150,
8. Pa element, upper view, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.),x 100,
9. Pa element, upper view, sample no. 96-UKT-672, early Norian (*E. abneptis* Con. Z.),x 100.

Figures 10-11 ***Epigondolella spatulata*** (HAYASHI)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
10. Sample No. 98-UKT-58, early Norian (? *E. abneptis* Con. Z.), x 100,
11. Sample No. 96-UKT-58, early Norian (? *E. abneptis* Con. Z.), x 100.

Figures 12-13 ***Epigondolella triangularis*** (BUDUROV)
Yaylakuzdere Measured Section from the Alakircay Nappe of the Antalya Nappes,
12. Pa element, upper view, sample no. 98-UKT-69, early Norian (*E. triangularis* Con. Z.), x 100,
13. Pa element, upper view, sample no. 96-UKT-69, early Norian (*E. triangularis* Con. Z.), x 100.

Figure 14 ***Zieglericonus rhaeticus*** KOZUR & MOCK
Pa element (?), lateral view, sample no. 98-UKT-19, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, late Rhaetian (*Misikella ultima* Con. Z.) , x 300.

Figure 15 ***Neohindeodella* ? sp.**
Sc element (?), lateral view, sample no. 98-UKT-17, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, late Rhaetian, x 200.

Figure 16 ***Parvigondolella* ? sp.**
Pa element, lateral view, sample no. 96-UKT-476, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, late Rhaetian, x 200.

Figure 17 ***Grodella deliculata*** (MOSHER)
Sb element (?), lateral view, sample no. 98-UKT-21, Dikmetas Measured Section from the Cataltepe Nappe of the Antalya Nappes, late Rhaetian, x 100.

PLATE 47