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A new genus and species of an orbitoidal foraminifera: *Ilgazina unilateralis* n. gen., n. sp.

Yeni bir orbitoidal foraminifer cins ve türü: Ilgazina unilateralis *n. gen., n. sp.*

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Abstract

In the present paper, an orbitoidal foraminifera *Ilgazina unilateralis* n. gen. n. sp. from the Maastrichtian of Ilgaz-Tosya (S Kastamonu) region has been described and its structural differences have been compared with the taxa showing similar structure. The new genus, which very closely resembles the genera *Orbitoides*, *Sivasella* and *Hellenocyclina*, is clearly differentiated from them by the unilaterally situated chambers on its shell.

Key Words: Orbitoidal foraminifera ,N. gen.n. sp. , Maastrichtian, S Kastamonu- Turkey.

Öz

Bu çalışmada Ilgaz-Tosya (G Kastamonu) bölgesi Maastrihtiyen'inde bulunan orbitoidal foraminiferlerden Ilgazina unilateralis *n. gen. n. sp.'nin tanımı verilmiş ve tanımlanan yeni cinsin diğer benzerleri ile olan yapısal farklılıkları ortaya konulmuştur. Yeni cins, kavkısının sadece tek tarafında yer alan lateral locaları nedeniyle, yakın benzerlik gösterdiği* Orbitoides, Sivasella *ve* Hellenocyclina *cinslerinden kolayca ayırdedilir.*

Anahtar Sözcükler: *Orbitoidal foraminifer,Yeni cins, yeni tür, Maastrihtiyen-G Kastamonu-Türkiye.*

INTRODUCTION

The study area is situated to the south of Kastamonu, and lies between the towns of Tosya and Ilgaz (Fig. 1). In this study the new genus named *Ilgazina* was determined from the samples colled from the sandy limestone bands of the Ödemiş formation (Hakyemez et all., 1986) and the Dikenlipınarın Tepe member (Pehlivan et all., 1987) (Fig. 2). The Dikenlipınarın Tepe member of the Ödemiş formation is defined as mapable limestone and sandy limestone interbeds of the Ödemiş formation (Pehlivan et all., 1987). In the study area, the Dikenlipınarın Tepe member can be traced for about 5 km as thin intervals extending eastwards from approximately 4 km northeast of Tondur village. Sandy limestones and calcerous sandstones are grayish white to pale yellow, poorly consolidated and made up of medium to thick-bedded lensoid units that show lateral and vertical transitions. This unit is about 100 meters thick. The Ödemiş formation is gradational both with Paleogene aged the Pilavtepe formation and the gradational both with Paleogene aged the Pilavtepe formation and the Hacet formation; the latter occurs to the northeast of Ödemiş village (Pehlivan et all., 1987). From the samples collected from sandy limestone intervals that exposed about 1.3 km west of Çifter Yaylası, (F 31-c4 sheet) an association of benthic foraminifers, mainly composed of *Siderolites calcitrapoides* Lamarck, *Lepidorbitoides* sp., *Orbitoides apiculatus* Schlumberger, *Orbitoides medius* (d'Archiac), *Orbitoides* sp., *Rotalia* sp., *Siderolites* sp. and *Ilgazina unilateralis* n. gen. n. sp., were recorded (Fig. 3). Thin section analysis revealed that the sandy limestones are composed of 30 percent of fossils, 15 to 20 percent of volcanigenic sands, very rare clay, silt-sized quartzs, feldspaths and opaque minerals together with abundant intraclasts and sedimentary lithic fragments. For the fact that the studied thin sections were abtained from well durated rock samples, it has been realised impossible to obtain an individual form in order to study its oriented sections.

SYSTEMATIC DESCRIPTION

Phylum	:	PROTOZOA Goldfuss 1817
Subphylum	:	SARCODINA Schmarda 1871
Class	:	RHIZOPODEA von Siebold 1845
Order	:	FORAMINIFERIDA Eichwald 1830
Suborder	:	ROTALIINA Delage and Herouard 1896
Supperfamily:		ORBITOIDACEA Schwager 1876
Family	:	ORBITOIDIDAE Schwager 1876
Subfamily	:	ORBITOIDINAE Schwager 1876
Genus	:	*Ilgazina* n. gen.
Type species	:	*Ilgazina unilateralis* n. gen. n. sp.

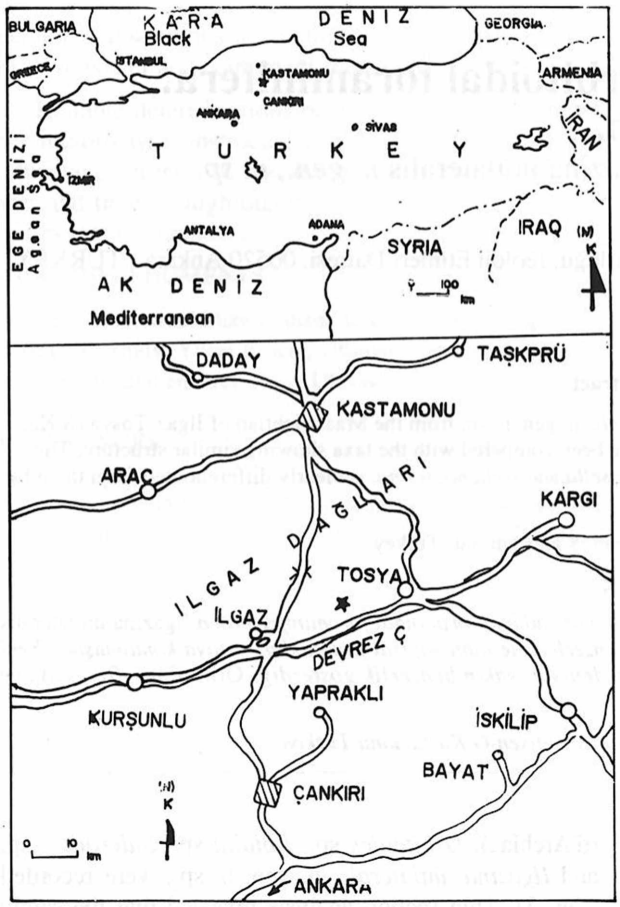

Figure 1. Location map of the investigated area.
Şekil 1. İnceleme alanının yer bulduru haritası.

Derivation of name: The name of the genus is given after the spectacular Ilgaz Mountains in the study area.

Defining features: The test is half discoidal in shape. The unilocular, bilocular or trilocular embryonic apparatus is located at the centre of the equatorial plane and is surrounded by a thick cover. It is characterized by the presence of an hyaline calcerous layer that covers the equatorial chambers. The peripheral thickness of the half discoid form is increased with the formation of additional chambers at the equatorial level.

Ilgazina unilateralis n. gen. n. sp.

(Plate I, Figure 1-5; Plate II, Figure 1-4; Plate III, Figure 1-6; Plate IV, Figure 1-6).

Derivation of name: The name unilateralis is derived from the fact that the new species is characterized by he presence of lateral chambers that developed only at one side of the test.

Holotype: Axial section, (KE-1), Plate I, Figure 1,2

Paratype : Axial section, (KE - 1, 2, 3, 4, 6, 11), Plate I, Figure 4 , 5; Plate II, Figure 3,4; Plate III, Figure 1-4, 6; Plate IV, Figure 1.

Deposition of types: Holotype and paratypes of this specimen are kept at the Thin Section Archieves of the Paleontology Laboratory of MTA , Ankara, Turkey.

Type locality: It is found within the sandy limestone layers of the Ödemiş Formation which is located about 1.3 km west of Çifter Yaylası between Ilgaz and Tosya (F 31-c4 sheet).

Type level: Maastrichtian.

Description: The tests is considerably large in size (2.5 to 6.1 mm), assymmetrical, half - discoidal and spherical. It has a thick embryon rim that surrounds the embryon from the outside. The embryon rim is 0.5 mm in thickness and always contains a black line. In macrospherical individuals the first chamber may be unilocular, bilocular or triple locular, whereas in microspherical individuals the first chamber is very small and the spirals of the equatorial chambers are evident (Plate II, Fig. 3, 4). Microspherical individuals are greater than macrospherical ones. It is estimated that the axial - diameters of the individuals, based on the thin section measurements of 40 samples, range between 2.5 to 6.1 mm, whereas the central thickness of the individuals vary between 0.30 to 0.92 mm. The equatorial chambers are arcuate in shape. The chambers are connected with each other throught tube - and pore - like stollons (Plate II, Fig. 2; Plate III, Fig. 1 - 4, 6). The lateral chambers are located only at one side of the equatorial plane with supporting pliers developed between the chambers to increase the test strength. The lateral chambers are located along the one side of the equatorial chambers and they provide support to the thickening of the test. In tangential sections they have the appearance of an irregular polygonal from. In axial sections, however, the lateral chambers appear to be regular rows extending among the pliers. The wall structure is a imperforate hyaline calcer. Dimorphism is well - developed. In axial sections it is characterized by the presence of unilateral chambers developed only at one side of the form and the formation of a hyaline calcer on the other side, covering the equatorial plane.

Similarities and differences: The new genus *Ilgazina* shows similarities with *Orbiotides*, *Sivasella* and *Hellenocyclina* genus in terms of orbitoidal foraminiferal characteristics. Of the genus *Orbitoides* lateral chambers and pliers exist at the both sides of the tests. At the centre, equatorial chambers appears to have developed in an arcuate form (Hottinger, 1981; Meriç, 1983; Neumann, 1972a, 1993). The genus *Hellenocyclina*, on the other hand, shows an arcuate - shaped equatorial chamber line at the centre and a calcite fill at the both sides of the test, but contains no stollons and lateral chambers

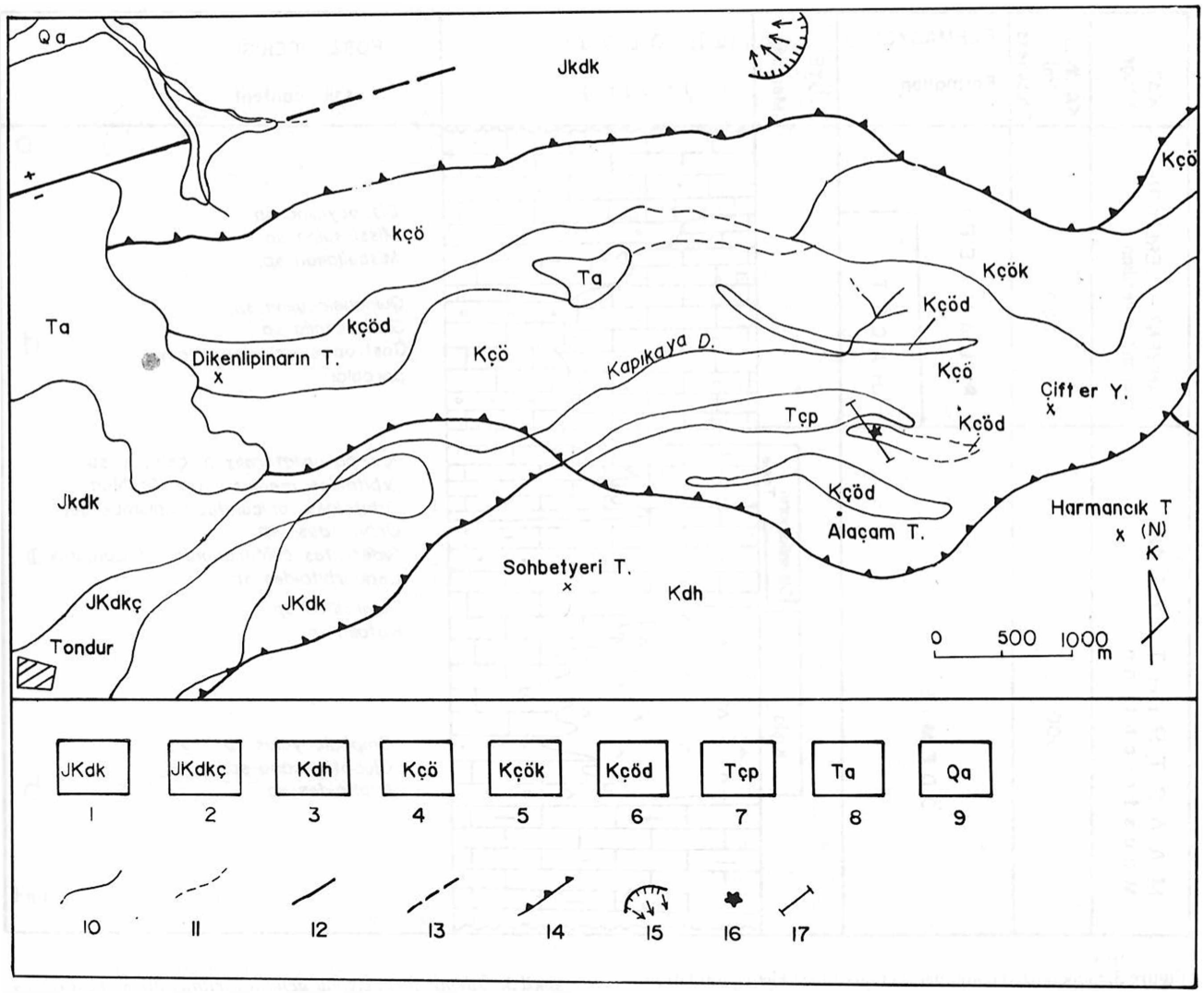

Figure 2. Simplified geologic map of the study area (modified from Pehlivan 1987).

1- Karapürçek formation (Neocomian), metadetritic, metavolcanite, metaultramaphite, 2-Çaltepe member (Neocomian), crystallized limestone. 3- Hacıhasan formation (Cenomanian-Turonian), alternation of sandstone, shale, clayey limestone, limestone, 4- Ödemiş formation (Maastrichtian), sandy limestone, limestone, sandstone volcanite. 5- Kışla member (Maastrichtian), 6- Dikenlipınarıntepe member (Maastrichtian), limestone, sandy limestone, carbonate bearing sandstone. 7- Pilavtepe formation (Montian-Thanetian) sandy limestone, limestone. 8- Alpagut formation (Pliocene-Quaternary), basalt, andesite, 9- Alluvium. 10- Contact. 11- Inferred contact. 12- Fault. 13- Inferred fault. 14- Thrust fault. 15- Landslide. 16- Type locality. 17- Location of section.

Şekil 2. *İnceleme alanının basitleştirilmiş jeoloji haritası (Pehlivan 1987'den değiştirilerek alınmıştır).*

1- Karapürçek formasyonu (Neokomiyen), metakırıntılı, metavolkanit, metaultramafit, 2- Çaltepe üyesi (Neokomiyen), kristalize kireçtaşı. 3- Hacıhasan formasyonu (Senomaniyen-Turoniyen), kumtaşı, şeyl, killi kireçtaşı, volkanit ardalanması. 4- Ödemiş formasyonu (Maastrihtiyen), kumlu kireçtaşı, kireçtaşı, kumtaşı. 5- Kışla üyesi (Maastrihtiyen), volkanit. 6- Dikenlipınarın Tepe üyesi (Maastrihtiyen), kireçtaşı, kumlu kireçtaşı, karbonatlı kumtaşı. 7- Pilavtepe formasyonu (Monsiyen-Tanesiyen), kumtaşı, çakıltaşı, kumlu kireçtaşı, ardalanması. 8- Alpagut formasyonu (Pliyosen-Kuvaterner), bazalt, andezit. 9- Alüvyon, 10- Dokanak. 11- Olasılı dokanak. 12- Fay. 13- Olasılı fay. 14- Bindirme hattı. 15- Yer kayması. 16- Tip yeri. 17- Kesit yeri.

(Reichel, 1949; Dupeuble, Neumann and Villain, 1972). Whereas the genus *Sivasella* is characterized by an arcuate -shaped line of equatorial chambers at the centre and the presence of lateral chambers and stollons deve-

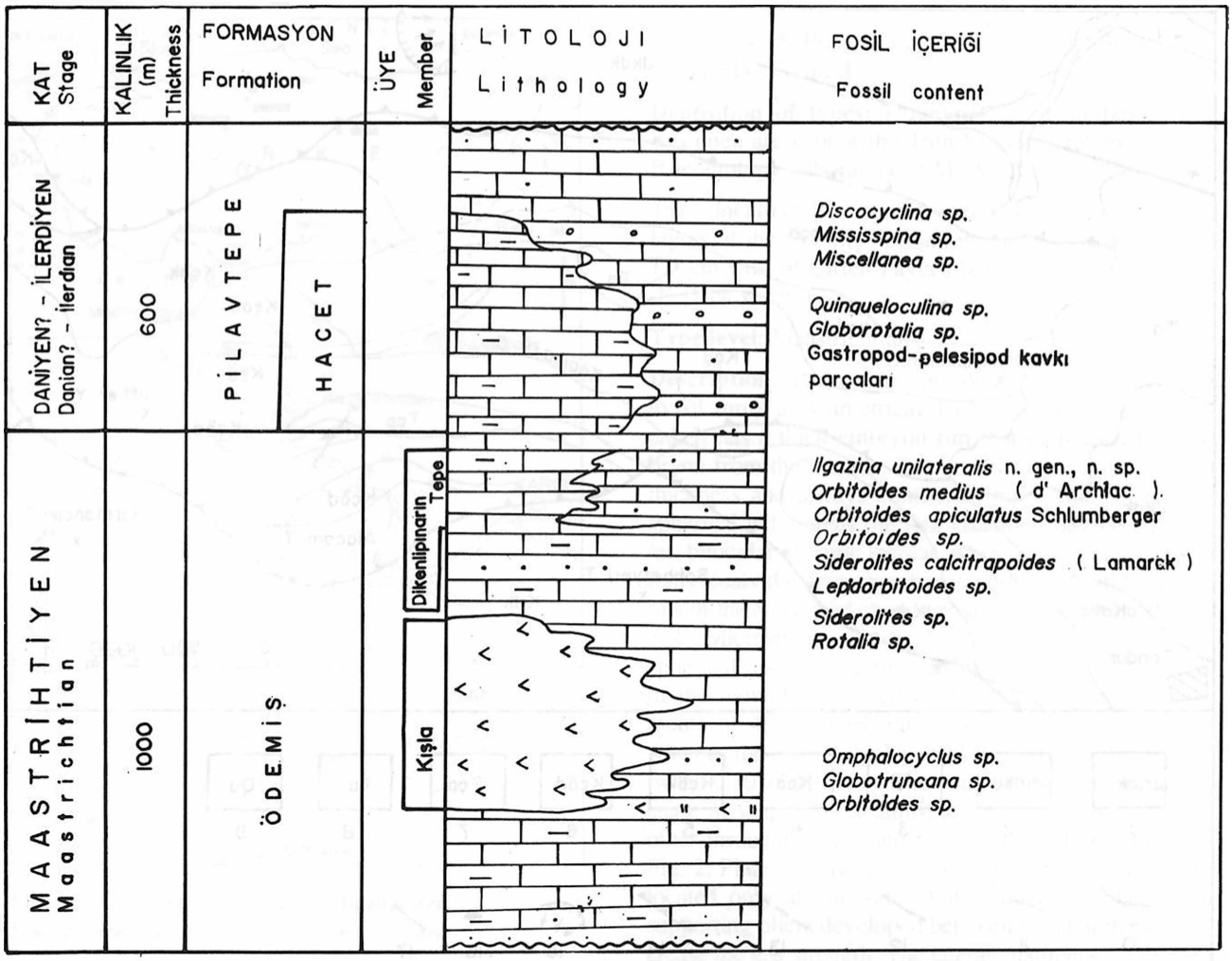

Figure 3. Generalized columnar section of the Ödemiş formation.

Şekil 3. Ödemiş formasyonu genelleştirilmiş dikme kesiti.

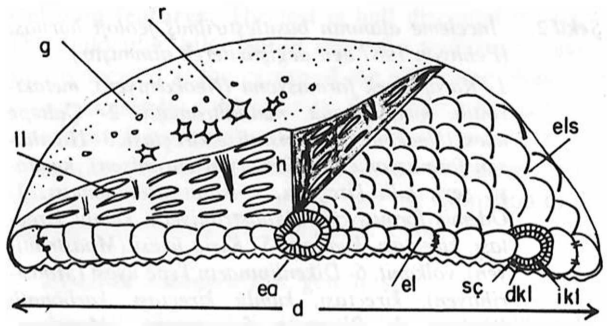

Figure 4. The structural model of the *Ilgazina unilateralis* n. gen. n. sp. el: Equatorial chambers, 11: Lateral chambers, ea: Embryonic apparatus, els: Equatorial chamber and stolons, h: Central thickness, d: Diameter, sç: Black line, ikl: Inner calcerous lamella, dkl: Outer calcareous lamellae, g: Granules, r: Rosets.

Şekil 4. Ilgazina unilateralis *n. gen. n. sp.'nin yapısal modeli el: Ekvatoryal localar, 11: Lateral localar, ea: ilk loca, els: Ekvatoryal localar ve stolonlar, h: Merkezi kalınlık, d: Çap, sç: Siyah çizgi, ikl: İç kalker lameli, dkl: Dış kalker lameli, g: Granüller, r: Rozetler.*

loped only at one side of the test. On the other side of the test the calcereous fill apperas to have developed (Sirel and Gündüz, 1978).

In the new genus *Ilgazina*, however, the equatorial chambers developed in an arcuate form at the centre and lateral chambers and stolons are located only at one side of the equatorial plane. The hyaline calcer bearing side, which covers the equatorial plane, is commonly concave, but flat - sided individuals are also found. Furthermore, it is considerably large structure in terms of the dimensions of the widths and lengths of its lateral chambers which ranges between 2.5 and 6.1 mm (the central thickness varies between 0.30 and 0.92 mm). Considering these characteristics, it is distinguished from a more delicate internal structure bearing genus *Sivasella* Sirel and Gündüz, despite its close similarities in terms of the dimensions and the presence of a concave hyaline calcer. It simply differs from the genus *Orbitoids* d' ORBIGNY in terms of the presence of unilateral chambers despite their similarities ragarding or-

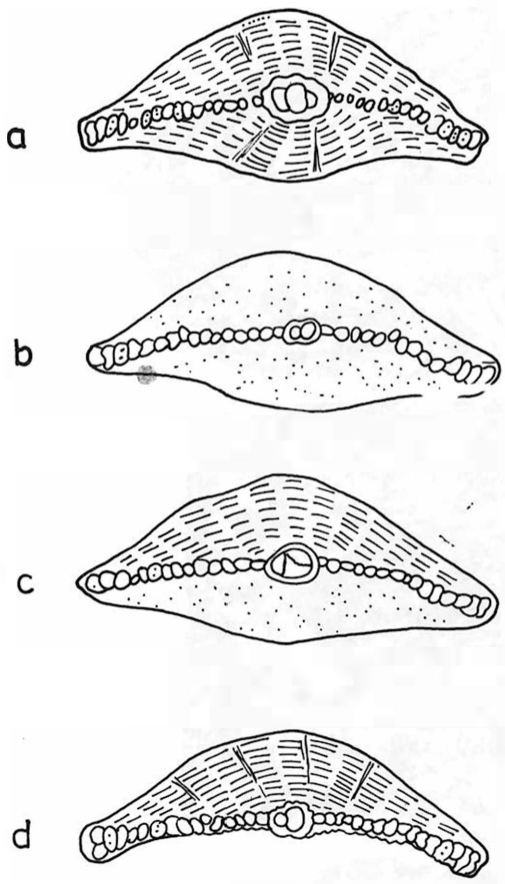

Figure 5. Schematic and axial sections showing the structural differences among the *Ilgazina* n. gen. and its affinities a: *Orbitoides*, b: *Hellenocyclina*, c: *Sivasella*, d: *Ilgazina* n. gen. (For explanations see text).

Şekil 5. Ilgazina *n. gen'in yakın cinsler ile yapısal farklılıklarını gösteren şematik eksenel kesitler.a:* Orbitoides, *b:* Hellenocyclina, *c:* Sivasella, *d:* Ilgazina *n. gen. (Açıklamalar metin içindedir).*

bitoidal characteristics and dimensions, and as well as, from the genus *Hellenocyclina* Reichel which is devoid of lateral chambers (Fig. 5).

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PLATE I

Ilgazina unilateralis n. gen. n. sp.

Ödemiş formation, Maastrichtian

Figure 1. Axial section, macrospheric form, holotype, (KE-1), x39.

Figure 2. Axial section, embryonic apparatus and radius, holotype, x62.5

Figure 3. Axial section, macrospheric form, paratype, (KE-11), x39.

Figure 4. Axial section, macrospheric form, paratype, (KE-4), x39.

Figure 5. Axial section, macrospheric form, paratype, (KE-1), x39.

LEVHA I

Ilgazina unilateralis ***n. gen. n. sp.***

Ödemiş formasyonu, Maastrihtiyen

Şekil 1. *Eksenel kesit, makrosferik şekil, holotip, (KE-1), x39*

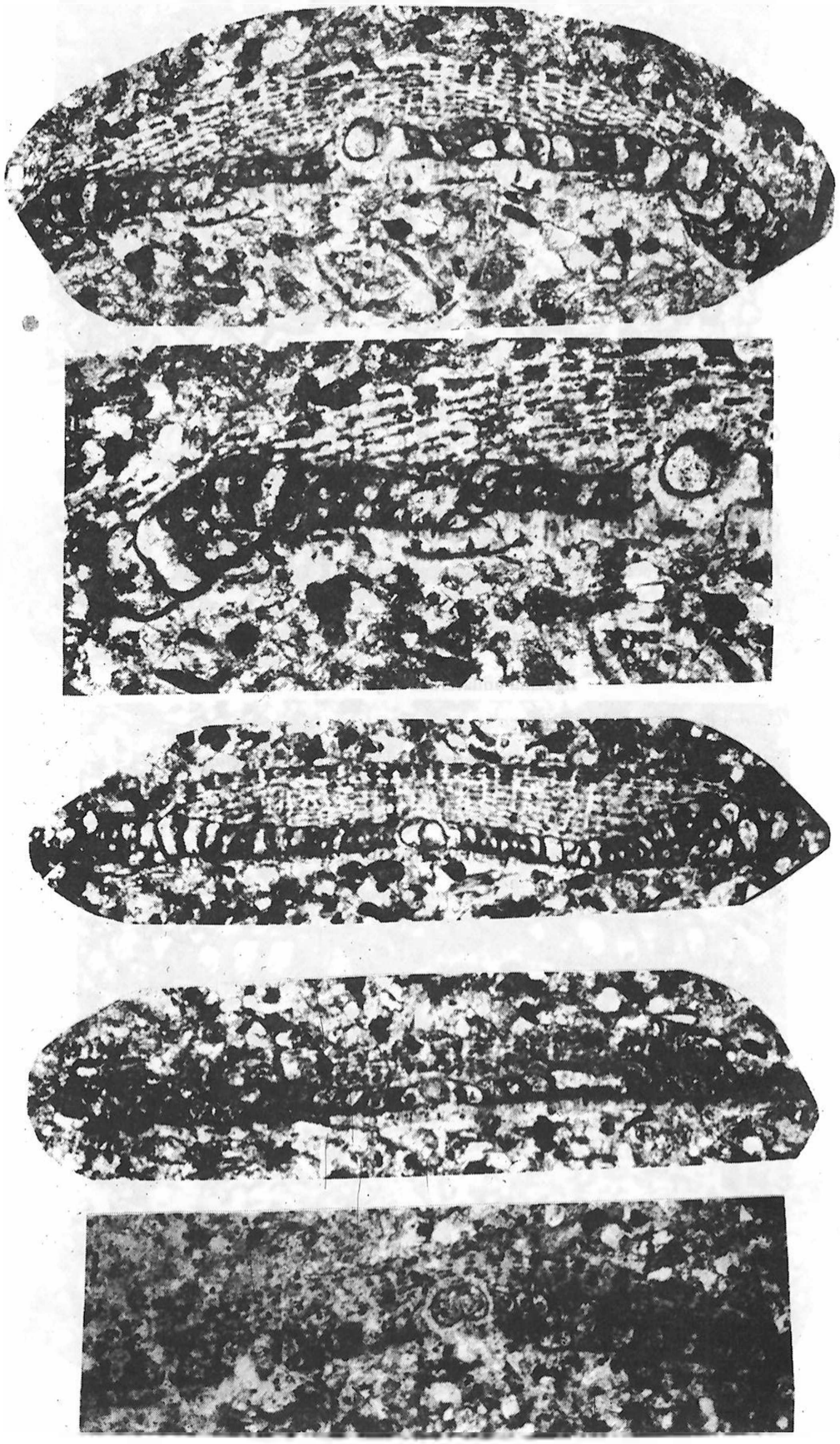
Şekil 2. *Eksenel kesit, embriyonik cihaz ve yarıçapı, holotip, x62.5*

Şekil 3. *Eksenel kesit, makrosferik şekil, paratip, (KE-11), x39*

Şekil 4. *Eksenel kesit, makrosferik şekil, paratip, (KE-4), x39*

Şekil 5. *Eksenel kesit, makrosferik şekil, paratip, (KE-1), x39.*

PLATE I
LEVHA I



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4

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PLATE II

***Ilgazina unilateralis* n. gen. n. sp.**

Ödemiş formation, Maastrichtian

Figure 1. Sandy limestone with *Orbitoides* and *Ilgazina unilateralis* n. gen. n. sp. (KE-3), x39.

Figure 2. Subaxial section, (KE-1), x39.

Figure 3. Axial section, microspheric form, paratype, (KE-1), x39.

Figure 4. Axial section, microspheric from, radius, paratype, (KE-1), x39.

LEVHA II

Ilgazina unilateralis *n. gen. n. sp.*

Ödemiş formasyonu, Maastrihtiyen

Şekil 1. Ilgazina unilateralis *n. gen. n. sp. ve* Orbitoides*'li kumlu kireçtaşı, (KE-3), x39.*

Şekil 2. *Eksene yakın bir düzlemden geçen kesit, (KE-1)x39.*

Şekil 3. *Eksenel kesit, mikrosferik şekil, paratip, (KE-1), x39.*

Şekil 4. *Eksenel kesit, mikrosferik şekil, yarıçapı, paratip, (KE-1), x39.*

PLATE II
LEVHA II

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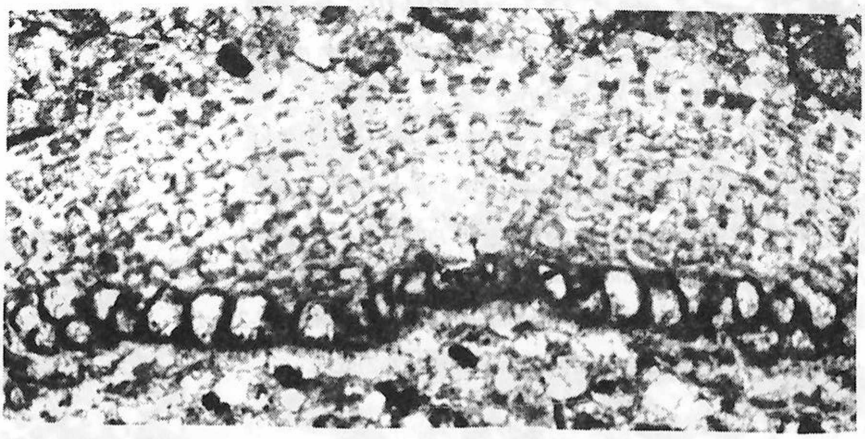

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PLATE III

***Ilgazina unilateralis* n. gen. n. sp.**

Ödemiş formation, Maastrichtian

Figure 1. Subequatorial section, slightly oblique, paratype, (KE-2), x39.

Figure 2. Axial section, macrospheric form, paratype, (KE-1), x39.

Figure 3. Axial section, macrospheric form, paratype, (KE-2), x39.

Figure 4. Subequatorial section, slightly oblique, paratype, (KE-1), x39.

Figure 5. Showing equatorial chambers and stolons section, (KE-2), x156.

Figure 6. Oblique subequatorial section, paratype, (KE-2), x39.

LEVHA III

Ilgazina unilateralis *n. gen. n. sp.*

Ödemiş formasyonu, Maastrihtiyen

***Şekil 1.** Hafifçe eğik subekvatoryal kesit, paratip (KE-2), x39.*

***Şekil 2.** Eksenel kesit, makrosferik şekil, paratip, (KE-1), x39.*

***Şekil 3.** Eksenel kesit, makrosferik şekil, paratip, (KE-2), x39.*

***Şekil 4.** Hafifçe eğik Subekvatoryal kesit, paratip, (KE-1), x39.*

***Şekil 5.** Ekvatoryal locaları ve stolonları gösteren kesit, (KE-2), x156.*

***Şekil 6.** Eğik subekvatoryal kesit, paratip , (KE-2), x39.*

PLATE III
LEVHA III

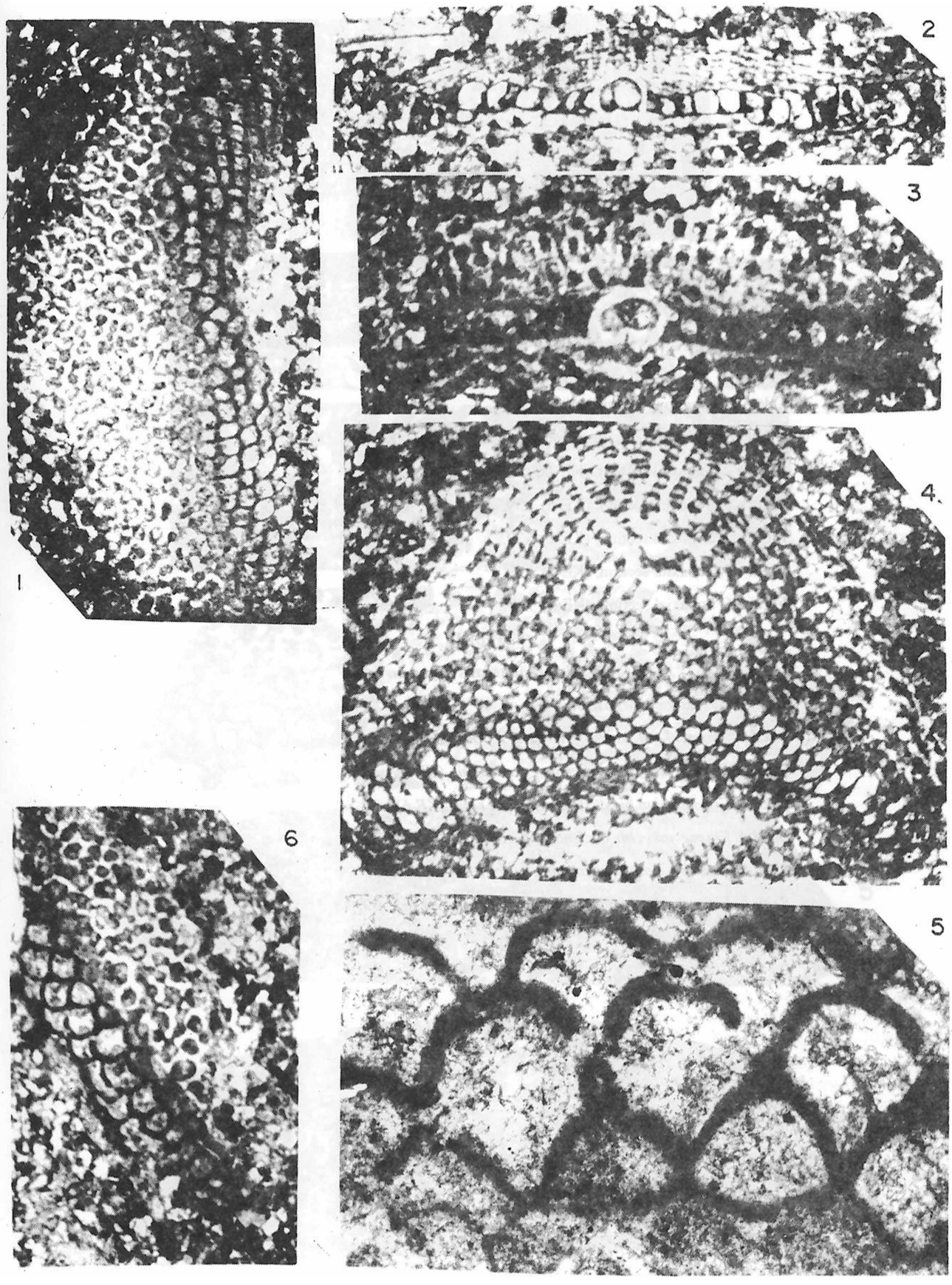

PLATE IV

***Ilgazina unilateralis* n. gen. n. sp.**

Ödemiş formation, Maastrichtian

Figure 1. Axial section, macrospheric form, paratype, (KE-11), x39.

Figure 2. Subaxial section, (KE-1), x39.

Figure 3. Subaxial section, (KE-6), x39.

Figure 4. Subaxial section, (KE-1), x39.

Figure 5. Subaxial section, (KE-1), x39.

Figure 6. Subaxial section, (KE-6), x39.

LEVHA IV

Ilgazina unilateralis *n. gen. n. sp.*

Ödemiş formasyonu, Maastrihtiyen

Şekil 1. *Eksenel kesit, makrosferik şekil,paratip (KE-11), x39.*

Şekil 2. *Eksene yakın bir düzlemden geçen kesit, (KE-1), x39.*

Şekil 3. *Eksene yakın bir düzlemden geçen kesit, (KE-6), x39.*

Şekil 4. *Eksene yakın bir düzlemden geçen kesit, (KE-1), x39.*

Şekil 5. *Eksene yakın bir düzlemden geçen kesit, (KE-1), x39.*

Şekil 6. *Eksene yakın bir düzlemden geçen kesit, (KE-6), x39.*

PLATE IV
LEVHA IV