

Sanctus sinaicus n. gen., n. sp. (Foraminiferida, Amphisteginidae) from Late Eocene of Sinai, Egypt

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ABSTRACT: *Sanctus sinaicus* nov. gen et sp. is described from material collected in the uppermost part of the Khaboba Formation and throughout the Tanka and Tayiba formations of Wadi Thal and Wadi Matulla in West-Central Sinai. We assign this new genus and species to the Late Eocene according to associated planktonic foraminiferal assemblages. Its test is symmetrical in axial section with the division of chambers in the same section similar to that of amphisteginids in their early ontogenetic stage and lacks a canal system. In comparing *Sanctus sinaicus* with related amphisteginid species, such as *Penoperculoides cubaensis* Cole and Gravell 1952 from the Caribbean; *Penoperculoides rozlozsniki* (Méhes) (ex: *Nummulites rozlozsniki* Méhes) from Hungary; and “Non *Nummulites rozlozsniki*” described by Sander 1962, from the Dammam Formation of Saudi Arabia, we find that *Sanctus sinaicus* is similar to *P. cubaensis* in the type of coiling and the character of the umbo, which lacks alar prolongations, a canal system and transverse trabeculae, and differs from species of *Nummulites* in the central subdivision of chambers.

Key words: Stratigraphy, Larger Foraminifera, Amphisteginidae, Systematic paleontology, Late Eocene, Sinai, Egypt

INTRODUCTION

Two stratigraphic sections in the eastern side of the Gulf of Suez, Sinai, Egypt (text-fig. 1), were selected for micropaleontological study of the Upper Eocene sequence of this region, at Wadi Thal (Lat. 29° 08' 53" N and Long. 33° 02' 30" E) and at Wadi Matulla (Lat. 29° 05' N and Long. 33° 12' 09" E), (text-fig. 2).

Sixty-two rock samples were collected from 138m of measured section represented in both localities, consisting of the uppermost part of the Khaboba Formation, succeeded by the full thickness of the Tanka and Tayiba formations, as determined in this same sections by Abd-El Shafy et al. (2007). The measured section is characterized by distinctive Upper Eocene foraminiferal assemblages, with planktic foraminifera including *Turborotalia cocoaensis*, *Turb. ampliapertura*, *Turb. pseudoampliapertura*, *Turb. increbescens*, *Turb. pomeroli*, *Turb. cerroazulensis*, *Hantkenina alabamensis*, *H. primitiva*, *Globigerinatheka tropicalis*, *Gk. index*, *Catapsydrax dissimilis*, *Catapsydrax howei*, *Subbotina yeguaensis*, *S. angiporoides*, *S. corpulenta*, *S. linaperta*, *S. eocaena*, *Subbotina gortanii*, *Dentoglobigerina tripartita* and *Dentoglobigerina pseudovenezuelana*, and benthic foraminifera including *Bathysiphon eocenicus*, *Bathysiphon saidi*, *Haplophragmoides subglobosum*, *Textularia fahmyi*, *Karriella* cf. *K. subglabra*, *Ammomassilina* sp., *Quinqueloculina* sp., *Triloculina* sp., *Lenticulina trompi*, *Saracenaria triangularis*, *Vaginulinopsis* sp., *Bulimina jacksonensis*, *Pleurostomella clavata*, *Uvigerina elongata*, *U. cocoaensis*, *U. jacksonensis*, *Stilostomella midwayensis*, *Bolivina arta*, *Cancris subconicus* and *Cancris* sp.

We here describe a new taxon, *Sanctus sinaicus* n.gen. n.sp., with the type from the Tanka Formation but ranging through the entire measured section. In comparing the new taxon to possibly related forms, we find that it most closely resembles a species of *Penoperculoides* Cole and Gravell 1952, but lacks certain of the typical features of that genus.

Depository: The material used in this work is deposited in the Department of Geology, Suez Canal University, Ismailia, Egypt (Mattar collection).

SYSTEMATIC PALEONTOLOGY

The taxonomy followed here is that of Loeblich and Tappan (1988).

Order: FORAMINIFERIDA Eichwald 1830

Superfamily: ASTERIGERINACEA d'Orbigny 1839

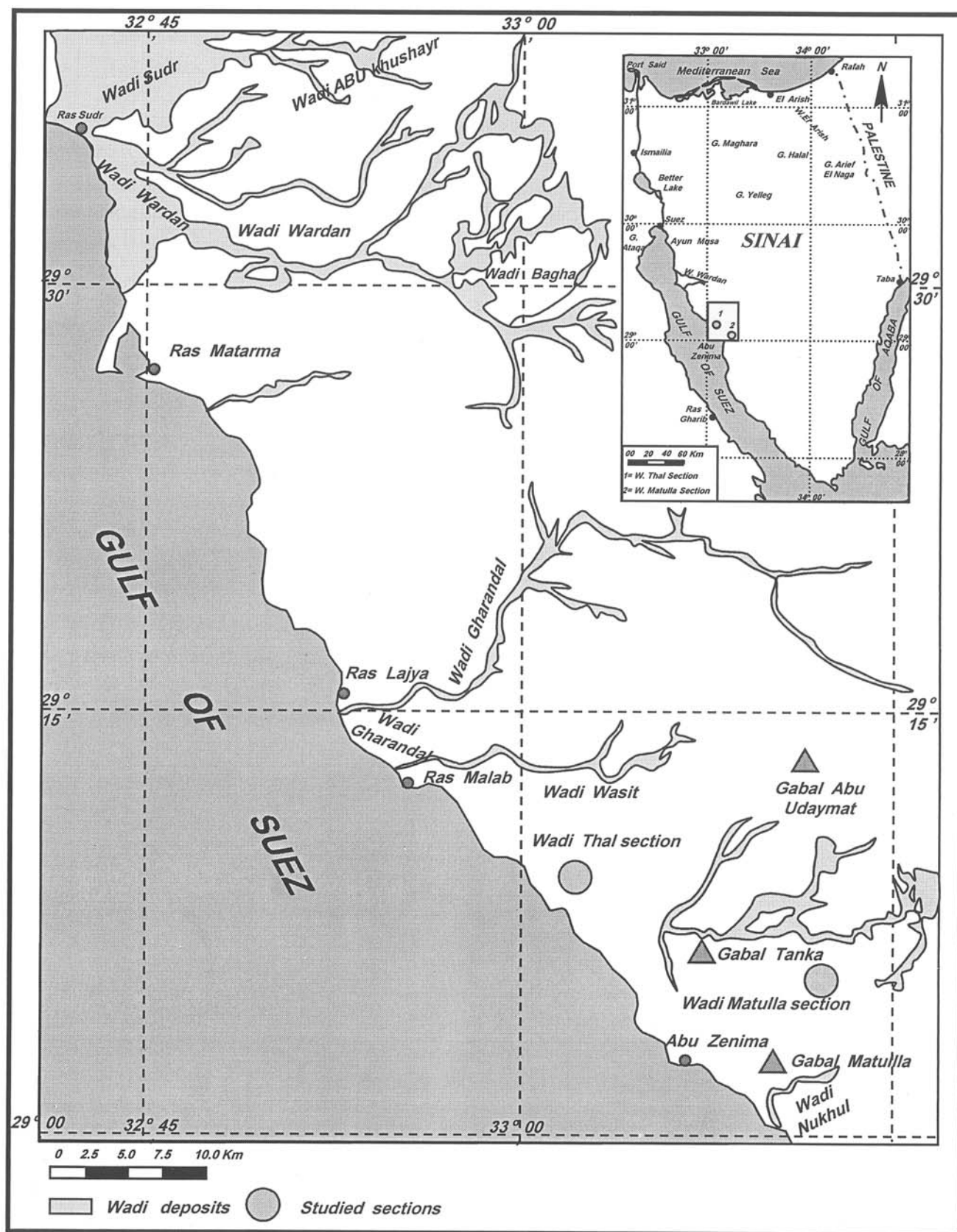
Family: AMPHISTEGINIDAE Cushman 1927

Genus: *Sanctus* Boukhary, Abd-Elshafi and Mattar **n. gen.**

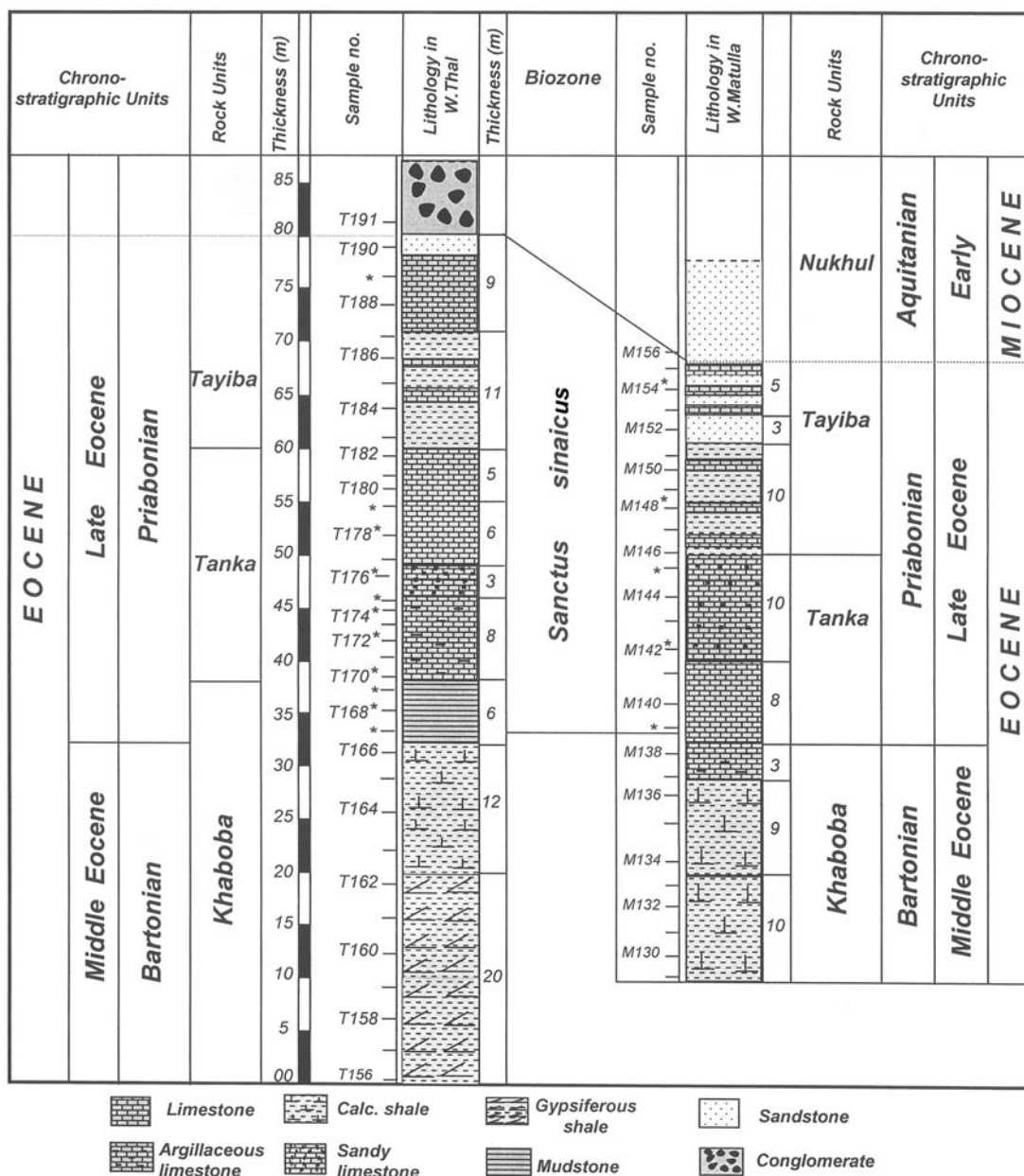
Type species: *Sanctus sinaicus* Boukhary, Abd-Elshafi and Mattar, n.sp.

Etymology: After the holy land of Sinai in Egypt.

Diagnosis: The genus is placed within Family Amphisteginidae Cushman 1927, in that the test is more or less symmetrical and the division of the chambers as seen in the axial section is similar to that of amphisteginids. Test is small, lenticular, slightly asymmetrical, biumbonate, planispirally enrolled with prominent raised umbonal pillars; the polar boss is punctuated with radial to curved and elevated septal filaments, with conspicuous



TEXT-FIGURE 1
Location Map of the studied sections (Compiled from the Geological Map of Egypt, Egyptian Geologic Survey 1981).



TEXT-FIGURE 2

Stratigraphic columnar sections of the studied Eocene sediments in Wadi Thal and Wadi Matulla, Sinai, Egypt

depressions between. Whorls without alar prolongations, with no marginal cord due to enrollment and without marginal canals and canal system.

Sanctus sinaicus Boukhary, Abd-Elshafi and Mattar **n. sp.**
Plate 1, figures 1–17

Penoperculoides sp.– ABD-ELSHAFI ET AL. 2007, p. 140, pl. 7, figs. 7–10.

Etymology: After Sinai Peninsula, Egypt.

Holotype: Megalospheric (A form), pl. 1, fig. 1, sample WT 174

Paratypes: 35 specimens

Type locality: Wadi Thal, West central Sinai, Egypt.

Type level: Upper Eocene, Priabonian Stage, Tanka Formation;

Description: Test small, lenticular, wall calcareous, lamellar and planispirally enrolled. Umbonal area with small granules reflecting the position of internal pillars as seen from the axial sections. Diameter ranges from 0.80 to 2.0mm and thickness ranges from 0.36 to 0.5mm. Number of whorls per radius is as follows: 4–5 in 0.4 to 1.0mm. Number of septa per 1/4 of whorl: 1st: 2, 2nd 3–4, 3rd: 4 and 4th 4–5. Septa thickened and doubled and slightly curved back at the periphery, with septal flap and

TABLE 1

Comparison between structural data of *Sanctus sinaicus* n. sp. (A form), *Penoperculoides cubaensis* Cole and Gravell, 1952 *Nummulites rozlozsniki* Kálmán Méhes (A form) and *Nummulites subplanulatus* (A and B) Hantken and Madarasz.

Species	Diameter and Thickness in mm.	W R	Number of partitions per 1/4 circle in								P	K	L	M in mm
			1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th				
			Whorls											
<i>Penoperculoides cubensis</i> Cole&Gravell , 1952	$\frac{2.2}{1.2}$	$\frac{4.5}{}$	1.5	2	3	4	-	-	-	-				0.055
<i>Nummulites rozlozsniki</i> Kálmán Méhes (A)	$\frac{0.9 - 2.5}{0.36-1.30}$	$\frac{4.0 - 5.0}{1. - 1.25}$	2	3-4	4	5	6-8				0.7 - 0.25	1. -1.60	I 1.4 II 1.4 III 1.2 IV	0.07 - 0.1
<i>Nummulites subplanulatus</i> (A)	$\frac{2.0-4.0}{0.7-1.5}$	$\frac{4.0 - 5.0}{2}$	2-3	~	5-6	~	8-9				0.25-0.12	1.5-2.0	1.5	0.15-0.2
<i>Nummulites rozlozsniki</i> (B)	$\frac{2.16 - 3.6}{0.8-1.3}$	$\frac{6.0}{1.3-1.47}$			4	6	6-7	6-7			0.33-0.15	1.2-1.3	I 1.6 II 1.2 III 1.2 IV 1.1 V.	
<i>Nummulites subplanulatus</i> (B)	$\frac{4 - 8}{1.25- 3.0}$	$\frac{8.0 - 9.0}{3-3.25}$			3-5	~	5-7	~	11-12	~	0.2-0.16	1.5-2.5	1.33	
<i>Sanctus sinaicus</i> n.gen. n. sp (A)	$\frac{0.8 - 2.0}{0.36-.50}$	$\frac{4.0}{0.4 - 1.0}$	2.0	3-4	4	4-5					0.25 - 0.40	0.5 – 0.7	I 0.3 II 0.3 III 0.4 IV 0.5	0.11

lacks intraseptal canal system. Chambers slightly higher than long. Aperture interiomarginal. Average diameter of the protoconch: 0.11mm.

A comparison between the morphological data of *Sanctus sinaicus* (A form), *Nummulites rozlozsniki* Kálmán Méhes (A form) and *Nummulites subplanulatus* is shown on table 1.

Remarks: According to Cole and Gravell (1952, p. 714), *Penoperculoides* is intermediate in most of its features between *Amphistegina* and *Operculinoides*. *Sanctus sinaicus* specimens are similar to *Penoperculoides cubaensis* Cole and Gravell, but they also bear some differences from the former with regard to the outline, the position of the proloculum, the size of the final

chambers and in displaying a less dense granulation (plate 1). *Sanctus sinaicus* has fewer whorls and an umbonal area with fewer pustules. Its chambers in the central part, as seen from the axial section, are also less subdivided. It differs from *P. rozlozsniki* (Méhes) in having fewer and tighter whorls.

It is worth to notice that *Nummulites rozlozsniki*, as described by Sander (1962), is a separate and valid species of *Nummulites* gr. *fabianii* that is totally different from the taxon originally described as *Nummulites rozlozsniki* by Méhes (1963), from the Ypresian of Hungary.

Stratigraphic distribution: *Sanctus sinaica* n. gen. n. sp. is recorded within the planktonic foraminiferal assemblage charac-

PLATE 1

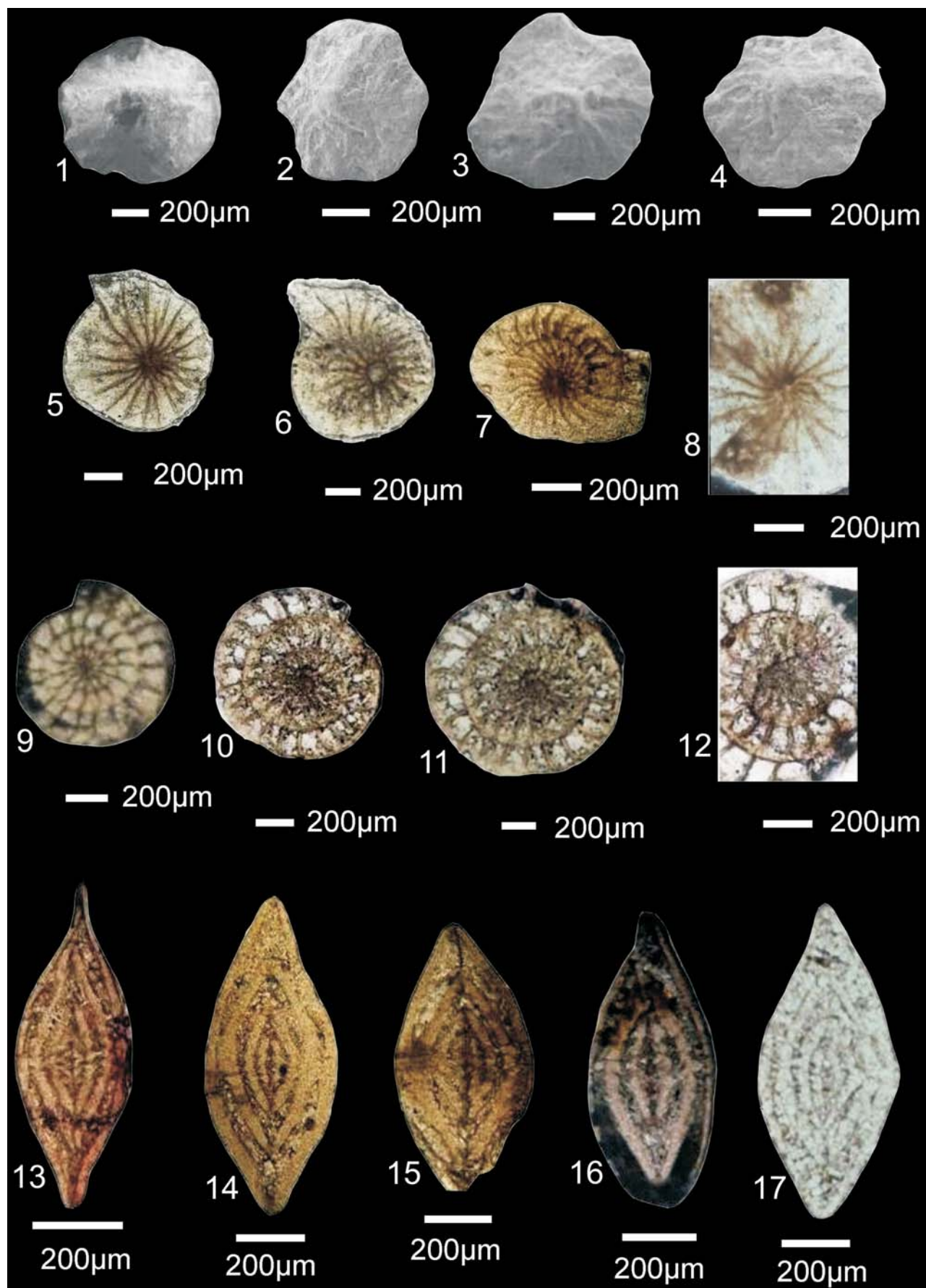
Sanctus sinaicus Boukhary, Abd-Elshafi and Mattar n. gen, n. sp.

1-4 external;

5-8 tangential section

9-12 equatorial section

13-17 axial sections.



teristic of the *Globigerinatheka semiinvoluta* Zone, and ranges into the overlying *Turborotalia cerroazulensis* Zone of Wadi Bagha to the north of the studied sections. *Sanctus sinaicus* n.gen. n.sp. is recorded within the same planktonic zones by Dr. Flora Hayrapetyan (personal communication) from the section Landjar, in the south western part of Armenia. Future studies may reveal that this taxon has horizontal distribution in the Tethyan basin.

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