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## REVIEW ARTICLE

# CONTRIBUTION TO THE PALEONTOLOGY, STRATIGRAPHY AND PALEO-BIOGEOGRAPHY OF SOME DIAGNOSTIC PAKISTANIAN PALEOGENE FORAMINIFER IN THE MIDDLE EAST

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## ARTICLE DETAILS

## ABSTRACT

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## ABSTRACT

This paper deals with new information on paleontology and stratigraphy of eighteen Pakistanian Paleogene foraminiferal species and its paleogeographic distribution in the Tethyan Middle East. These species are: *Tritaxia elongata*, *T. limbata*, *Siphogaudryina daviesi*, *S. elongata*, *Textularia* sp. (= *T. farafraensis*, *T. punjabensis*, *Pseudoclavulina pseudohumilis* (= *P. farafraensis*), *Globanomalina ovalis* (= *G. luxorensis*, *Fursenkoina dubia*, *Sakhiella nammalensis*, *Valvulineria nammalensis*, *Discorbis globiformis*, *Cibicoides grandis*, *C. nammalensis*, *Rectoepionides dubia* (= *Karrerria fallax*), *Ornatomalina hafeezi* and *Pararotalia khirthari*. One of the illustrated species is believed to be new: *Nonionella haquei* Anan, n. sp. Detailed study of rich and well preserved Pakistanian taxa were introduced by Haque made it possible to correlate them with those previously identified species in the coeval sequence in different Middle East and other Tethyan localities.

## KEYWORDS

Paleontology, stratigraphy, paleogeography, foraminifera, Paleogene, Pakistan, Egypt, Tethys, Middle East

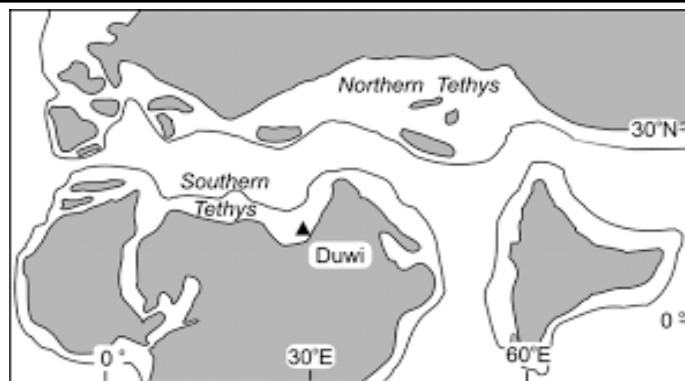
## 1. INTRODUCTION

The present study aims at throwing light on eighteen Pakistanian diagnostic Paleogene foraminiferal species and its paleogeographic distribution in the Tethyan Middle East and Europe (Figure 1): Asia (India, Pakistan, Iran, UAE, Qatar, Saudi Arabia, Iraq, Jordan), North Africa (Egypt, Tunisia, Nigeria) and Europe (France, Italy). An additional

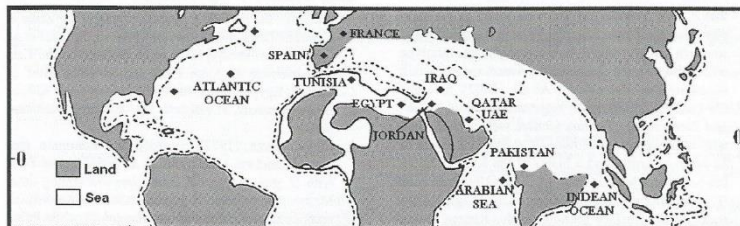
information about the paleogeography of these species are also presented in other Northern and Southern Tethyan localities (Figure 2) [1-7]. These wide paleogeographic distribution indicate that the ancestral Tethys is connected with the ancestral Atlantic and Indian Oceans via Mediterranean Sea in that time (Figure 3).



**Figure 1:** Location map of Pakistan related to other countries in the Middle East in Southeast Asia (Iran, Iraq, Jordan, Saudi Arabia, Qatar, and UAE) and North Africa (Egypt).



**Figure 2:** Paleocene Paleogeography distribution of the Northern Tethys and the Southern Tethys throughout the West Africa (extend to Nigeria), which also detected the location of the Gabal Duwi section (Egypt), after Anan [37].



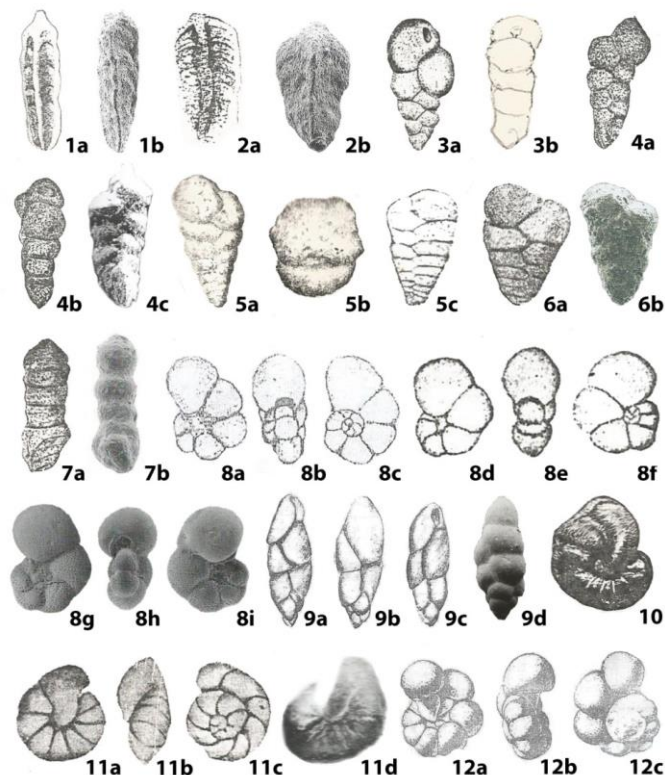
**Figure 3:** Paleogeographic map in the K/T showing some Tethyan localities from Atlantic Ocean to Indian Ocean via Mediterranean Sea, including Pakistan and also UAE, Qatar, Iraq, Jordan, Egypt, Tunisia, France [34, 35].

**2. TAXONOMY**

Eighteen Paleogene Pakistanian foraminiferal species are identified and illustrated in Plates (1, 2). The classification is followed in this study [8]. Seven out of these species are agglutinated, one species is plankton, while

the other ten benthic foraminiferal species are related to Rotaliids. Brief remarks will be added to all identified species.

**Plate 1**



**Figure 1a, b:** *Tritaxia elongata* (Haque, 1956): (a) *Clavulinoides lakiensis elongata* Pakistan; (b) *Tritaxia lakiensis elongata* (Haque), Anan (1996), Jabal Hafit, UAE.

**Figure 2a, b:** *Tritaxia limbata* (Haque, 1956): (a) *Clavulinoides lakiensis limbata* Haque (1956); (b) *Tritaxia lakiensis limbata* (Haque), Anan (1996), Jabal Hafit, UAE.

**Figure 3a, b:** *Siphogaudryina daviesi* (Haque, 1956): (a) *Gaudryina daviesi* Haque (1956), Pakistan; (b) *G. elegantissima* Said and Kenawy (1956), Egypt.

**Figure 4a-c:** *Siphogaudryina elongata* (Haque, 1956); (a) *Gaudryina laevigata* Franke var. *elongata* Haque (1956), Pakistan; (b) *G. soldadoensis* tellburmaensis Futyan (1976), Jordan.

**Figure 5a-c:** *Textularia farafraensis* LeRoy (1935); (a, b) *Textularia farafraensis* LeRoy, (1953), Egypt; (c) *Textularia* sp. Haque (1956), Pakistan.

**Figure 6a, b:** *Textularia punjabensis* Haque (1956); (a) *Textularia punjabensis* Haque (1956), Pakistan; (b) *T. punjabensis* Haque, Orabi & Zaky (2016), Egypt.

**Figure 7a, b:** (a) *Pseudoclavulina pseudohumilis* Haque (1956), Pakistan; (b) *P. farafraensis* LeRoy (1953), Egypt.

**Figure 8a-i:** *Globanomalina luxorensis* (Nakkady, 1950), Egypt; (a-c) *Anomalina luxorensis* Nakkady, (1950); d-f: *Globanomalina ovalis* Haque (1956), Pakistan; (g-i) *G. luxorensis* (Nakkady), Speijer and Samir (1997), Egypt.

**Figure 9a-d:** *Fursenkoina dubia* (Haque, 1956), Pakistan; (a-c) *Virgulina dubia* Haque (1956), (d) *Fursenkoina dubia* (Haque), Gabal Duwi, Egypt (this study).

**Figure 10:** *Sakhiella nammalensis* Haque (1956), Pakistan.

**Figure 11a-d:** *Valvulineria nammalensis* Haque (1956), (a-c) *V. nammalensis* Haque, Pakistan; (d) *Valvulineria* sp. Anan (1993), Jabal Malaqet, UAE.

**Figure 12a-c:** *Discorbis globiformis* Haque (1962), Pakistan.

Order Foraminiferida Eichwald, 1830  
Suborder Textulariina Delage & Hérouard, 1896  
Superfamily Verneuilinacea Cushman, 1911  
Family Tritaxiidae Plotnikova, 1979  
Genus *Tritaxia* Reuss, 1860  
Type species *Textularia tricarinata* Reuss, 1860

***Tritaxia elongata* (Haque, 1956) (Pl. 1, Figure 1a, b)**

1956 *Clavulinoides lakiensis elongata* [1], p. 45, pl. 21, figure 13.  
1996 *Tritaxia lakiensis elongata*; [9], p. 150, figure 3.5.

Remarks: This Early Eocene species belongs here to the genus *Tritaxia* due to its triangular cross section along the elongate test. This species was recorded from Pakistan and UAE (Jabal Hafit).

***Tritaxia limbata* (Haque, 1956) (Pl. 1, figure 2a, b)**

1956 *Clavulinoides lakiensis limbata* [1], p. 45, pl. 21, figure 8.  
1996 *Tritaxia lakiensis limbata*; [9], p. 150, figure 3.6.

Remarks: This Early Eocene species has wider test than *Tritaxia elongata*. It was recorded from Pakistan and UAE (J. Hafit).

Family Verneuilinidae Cushman, 1911  
Subfamily Verneuilininae Cushman, 1911  
Genus *Siphogaudryina* Cushman, 1935

Type species *Gaudryina stephensoni* Cushman, 1928

***Siphogaudryina daviesi* (Haque, 1956) (Pl. 1, figure 3a, b)**

1956 *Gaudryina daviesi* [1], p. 37, pl. 31, figure 14.  
1956 *Gaudryina elegantissima* [10], p. 123, pl.1, figure 21.

Remarks: This Paleocene-Early Eocene species belongs here to the genus *Siphogaudryina* due to its subterminal aperture on the apertural face of the last formed chamber. It seems that the Pakistanian Early Eocene form *daviesi* is more resemble the Egyptian Paleocene form *elegantissima* [10]. This species was recorded from Pakistan, Egypt, UAE and Qatar.

***Siphogaudryina elongata* (Haque, 1956) (Pl. 1, figure 4a-c)**

1956 *Gaudryina laevigata* Franke var. *elongata* [1], p. 35, pl. 9, figure 5.  
1976 *Gaudryina soldadoensis tellburmaensis* [11], p. 522, pl. 81, fig. 1, non-figure 2).

Remarks: This Early Eocene species belongs here to the genus *Siphogaudryina*. It seems that the Jordanian *tellburmaensis* [11] is most related to Haque's *elongata* (Pakistan). This species was recorded, so far, from Pakistan and Jordan.

Superfamily Textulariacea Ehrenberg, 1838  
Family Textulariidae Ehrenberg, 1838  
Subfamily Textulariinae Ehrenberg, 1838  
Genus *Textularia* DeFrance, 1824  
Type species *Textularia sagittula* DeFrance, 1824

***Textularia farafraensis* LeRoy, 1953, p. 51, pl. 2, figs. 3, 4 (Pl. 1, figure 5a-c)**

1953 *Textularia farafraensis* [2], p. 51, pl. 2, figures. 3, 4.  
1956 *Textularia* sp. [1], p. 32, pl. 9, figure 10.

Remarks: Remarks: This Paleocene-Early Eocene species has rather coarse wall with inflated biserial chambers, about twice as long as broad, periphery broadly rounded, sutures nearly straight. It seems that the figured specimen of Haque is mostly related to the Egyptian *T. farafraensis* [2]. This species was recorded, so far, from Pakistan and Egypt.

***Textularia punjabensis* Haque, 1956 (Pl. 1, figure 6a, b)**

1956 *Textularia punjabensis* [1], p. 31, pl. 9, figure 12.  
1990 *Textularia punjabensis*; [15], p. 4, pl. 1, figures. 5, 6.  
2016 *Textularia punjabensis*; [12], p. 187, pl. 2, figure 18.

Remarks: This Paleocene species is characterized by its biserial test with coarsely agglutinated sand grains. It seems that the figured specimen *Textularia* sp. [1] (1956, p. 40, pl. 32, figure 2), the French *Gaudryina* sp. [13] (2005, p. 218, pl. 11, figure 29), and the Iranian *Textularia* sp. of [14] (2016, p. 6, pl. 2, figure 22) are closely related to the Pakistanian *T. punjabensis* Haque. It was recorded also from Egypt [12] and India [15], 1990, p. 4, pl. 1, figures. 5, 6.

Subfamily Pseudogaudryininae Loeblich & Tappan, 1985  
Genus *Pseudoclavulina* Cushman, 1936  
Type species *Clavulina clavata* Cushman, 1926

***Pseudoclavulina farafraensis* LeRoy, 1953 (Pl. 1, figure 7a, b)**

1953 *Pseudoclavulina farafraensis* [2], p. 44, pl. 2, figure 9.  
1956 *Pseudoclavulina pseudohumilis* [1], p. 42, pl. 9, figure 1.

Remarks: This Paleocene species has smooth wall, pronounced triserial stage, bulbous to discoidal chambers uniserial stage. It seems that the figured specimen of Haque' species *pseudohumilis* is mostly related to the Egyptian *T. farafraensis* [2]. It was recorded from Pakistan and also Egypt, Qatar [16], 1993 (p. 481, pl. 6, figures. 5, 6) and UAE [17], p. 360, figure 3y. Suborder Globigerinina Delage & Hérouard, 1896  
Superfamily Hantkeninacea Cushman, 1927  
Family Globanomaliniidae Loeblich & Tappan, 1984  
Genus *Globanomalina* Haque, 1956  
Type species *Globanomalina ovalis* Haque, 1956

***Globanomalina luxorensis* (Nakkady, 1950) (Pl. 1, figure 8a-i)**

1950 *Anomalina luxorensis* [3], p. 691, pl. 90, figures. 39-40.  
1956 *Globanomalina ovalis* [1], p. 148, pl. 14, figure 3.  
1997 *Globanomalina luxorensis*; [18], p. 53, pl. 1, figures. 4-6; pl. 2, figures. 1-4.  
2006 *Globanomalina luxorensis*; [19], p. 415, pl. 14.1, figure 1-10.  
2016 *Globanomalina ovalis* [14], p. 4, pl. 1, figure 2.

Remarks: This Early Eocene species belongs now to the planktic foraminifera. It is characterized by tightly coiled test, only five chambers in the last whorl with equatorially asymmetric aperture. It seems that the Pakistanian species (*G. ovalis* and *G. simplex* [1], p. 149, pl. 30, figure 2) are strongly suggested a close affinity to the Egyptian *G. luxorensis* [3]. This Early Eocene species were recorded from Pakistan and also some Middle East countries: Egypt [3] and Iran [14]. It is also recorded out of the Middle East, so far, in New Zealand, after [18].

Suborder Rotaliina Delage & Hérouard, 1896  
Superfamily Fursenkoinacea Loeblich & Tappan, 1961

Family Fursenkoinidae Loeblich & Tappan, 1961  
Genus *Fursenkoina* Loeblich & Tappan, 1961  
Type species *Virgulina squamosa* d'Orbigny, 1826

***Fursenkoina dubia* (Haque, 1956) (Pl. 1, figure 9a-d)**

1956 *Virgulina dubia* [1], pl. 25, figures. 3, 4.  
2003 *Fursenkoina* sp., [20], pl. 8, figure 14.

Remarks: The genus *Fursenkoina* [21] and they choice the *Virgulina squamosa* [22] as the type species of it. The Late Paleocene-Early Eocene species *V. dubia* has an elongated biserial test, rounded to ovate in section, slightly inflated chambers, the biserial twisted chambers throughout the test axis, suture depressed with smooth surface. It seems that the Egyptian figured form [20] (*Fursenkoina* sp., pl. 8, figure 14) is mostly related to Haque' species. Our figured specimen from Gabal Duwi, Egypt is closely related to the holotype of *F. dubia* ([1], pl. 25, figure 4), especially in the initial part of the test. This species was recorded, so far, from Pakistan and Egypt.

Superfamily Discorbacea Ehrenberg, 1838

Family Bagginidae Cushman, 1927

Subfamily Baggininae Cushman, 1927

Genus *Sakhiella* Haque, 1956

Type species *Sakhiella nammalensis* Haque, 1956

***Sakhiella nammalensis* Haque, 1956 (Pl. 1, figure 10)**

1956 *Sakhiella nammalensis* [1], p. 155, pl. 10, figure 1.  
2002 *Sakhiella nammalensis*; [23], p. 49, pl. 3, figure 10.

Remarks: This species has biconvex trochospiral test but with spiral side completely involute, aperture extending from umbilicus to the periphery

covered by a distinct umbilical flap. It was originally recorded from Paleocene-Early Eocene of Pakistan, but from Maastrichtian subsurface rocks of Simsim Formation of Qatar [23].

Genus *Valvulineria* Cushman, 1926

Type species *Valvulineria californica* Cushman, 1926

***Valvulineria nammalensis* Haque, 1956 (Pl. 1, figure 11a-d)**

1956 *Valvulineria nammalensis* [1], p. 159, pl. 7, figure 10.  
1993 *Valvulineria* sp. [24], p. 316, pl. 3, figure 3.

Remarks: This Paleocene-Early Eocene species has two and a half dorsal whorl, 9-10 ventral chambers, and interiomarginal umbilical-extraumbilical aperture with broad thin apertural flap projecting over the umbilicus. It seems that *Valvulineria* sp. [24] from Jabal Malaqet of UAE is mostly related to the Pakistanian species, which considered, so far, the second record of *V. nammalensis* outside Pakistan.

Family Discorbidae Ehrenberg, 1838

Genus *Discorbis* Lamarck, 1804

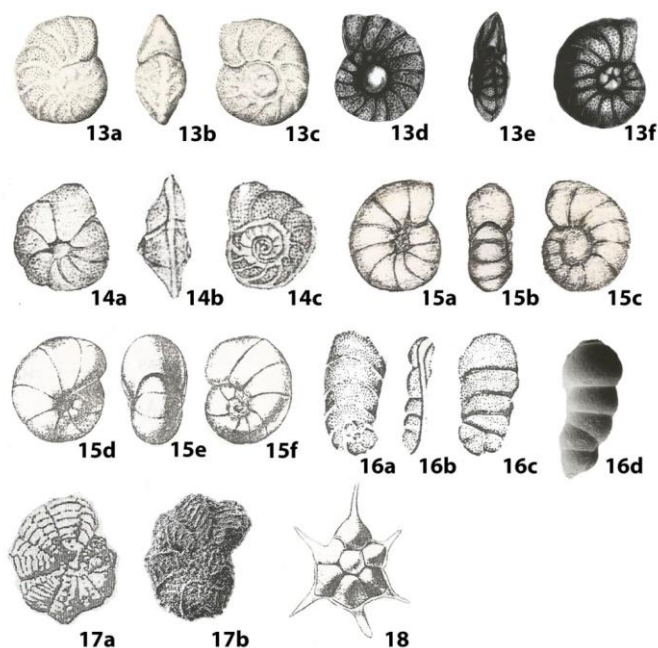
Type species *Discorbis vesicularis* Lamarck, 1804

***Discorbis globiformis* Haque, 1962 (Pl. 1, figure 12a-c)**

1962 *Discorbis globiformis* [14], p. 21, pl. 1, figures 3-5.  
2002 *Discorbis globiformis*; [23], p. 49, pl. 3, figure 11.

Remarks: This Maastrichtian-Early Eocene species is distinguished by its gradually inflated chambers and increasing gradually, highly trochospiral coil, umbilical region wide and covered by a long flap with smooth surface. This Early Eocene species was recorded from Pakistan, but from the Maastrichtian subsurface rocks of Qatar [23].

## Plate 2



Superfamily Discorbinellacea Sigal, 1952

Family Parrelloididae Hofker, 1956

Genus *Cibicidoides* Thalmann, 1939

Type species *Truncatolina mundula* Brady, Parker and Jones, 1890

***Cibicidoides grandis* LeRoy, 1953 (Pl. 2, Figure 13a-f)**

1953 *Cibicidoides grandis* [2], p. 18, pl. 9, figures. 6-8.

Remarks: This Maastrichtian-Paleocene Pakistanian species is characterized by its coarsely perforated large test with more than ten chambers in the last whorl, biumbonate test with distinct boss in the ventral side, limbate raised sutures in both sides with acute in edge view. It seems that *Cibicidoides jamburoensis* [5], (p. 230, pl. 3) is closely related to the Egyptian Maastrichtian species *C. grandis* [2], (p. 18, pl. 9, figures. 6-8), but topmost Maastrichtian-Paleocene in Sinai, Egypt [10]. This species was recorded, so far, from Egypt and Pakistan.

***Cibicidoides nammalensis* (Haque, 1956) (Pl. 2, Figure 14a-c)**

1956 *Cibicidoides nammalensis* [1], p. 205, pl. 20, figure 10.  
2005 *Cibicidoides nammalensis*; [13], p. 226, pl. 15, figure 35.  
2012 *Cibicidoides nammalensis*; [25], p. 10, figure 9. 20.

Remarks: This Early Eocene species is characterized by its biconvex test with keel, about 10-11 chambers in the ventral side with umbo, three whorls in the dorsal side. It is recorded from Pakistan, France, and later from Iraq [25].

Superfamily Nonionacea Schultze, 1854

Family Nonionidae Schultze, 1854

Subfamily Nonioninae Schultze, 1854

Genus *Nonionella* Cushman, 1926

Type species *Nonionella miocenica* Cushman, 1926

***Nonionella haquei* Anan, n. sp. (Pl. 2, figure 15a-f)**1956 *Nonionella* sp. [10], p. 156, pl. 7, figure 21.1960 *Nonionella* sp. [7], p. 24, pl. 6, figure 2.

Holotype: specimen of pl. 2, figure 15d-f.

Dimension: Diameter 1.45 mm, 0.43mm

Etymology: in the honor of the late Pakistanian paleontologist A.F. Haque.

Type locality: Sor Range, Quetta District, West Pakistan.

Age: Paleocene-Late Eocene.

Diagnosis: Test large, inflated, and equally biconvex but not symmetrically developed, periphery rounded, chambers about twelve in the last formed whorls, suture distinct, a slit on the periphery at the base of the last chamber.

Remarks: It seems that the Paleocene *Nonionella* sp. of Said & Kenawy [10] and *Nonionella* sp. [7] strongly falls within the morphological characters of the new species. The Early Eocene *N. haquei* n. sp. differs from the Early Eocene Egyptian *N. africana* of [2], p. 42, pl. 10, figures. 9-11) in its larger and more elongated test and chambers. It was recorded, so far, from Pakistan and Egypt.

Superfamily Chilostomellacea Brady, 1881

Family Karreriidae Saidova, 1981

Genus *Karrereria* Rzehak, 1891Type species *Karrereria fallax* Rzehak, 1891***Karrereria fallax* Rzehak, 1891 (Pl. 2, figure 16a-d)**1953 *Stichocibicides* sp. [2], p. 51, pl. 8, figure 27.1956 *Rectoepionides dubia* [1], p. 153, pl. 6, figure 6.

Remarks: This Maastrichtian-Early Eocene species is characterized by its trochospirally enrolled early stage with one and more volutions, alter stage uncoiled, suture slightly depressed with terminal and rounded aperture. It seems that the *Stichocibicides* sp. [2] is closely related to *K. fallax* [6]. It was recorded also from the Rockall Bank in the North Atlantic ([26], p. 444, pl.4, figure 9), France [13], p.189, pl.17, figure 18), Tunisia [27], p. 468, pl.12, figure 5), and Egypt [2]; ([28], p.113, pl. 9, figures 11,12).

Superfamily Rotaliacea Ehrenberg, 1839

Family Rotaliidae Ehrenberg, 1839

Subfamily Cuvillierininae Loeblich &amp; Tappan, 1964

Genus *Ornatomalina* Haque, 1956Type species *Ornatomalina geei* Haque, 1956***Ornatomalina hafeezi* Haque, 1956 (Pl. 2, figure 17)**1956 *Ornatomalina hafeezi* [1], p. 201, pl. 18, figure 6.

Remarks: The Pakistanian genus *Ornatomalina* [1] was considered [8] as a senior synonym of *Saudella* [29] from Saudi Arabia (SA), and considered *O. hafeezi* as a junior synonym of *O. geei*. This species was recorded in different localities in the Tethys: SA [29], Qatar [30] and Nigeria ([31], p. 68, pl. 7, figures. 1-8; pl. 8, figures. 1-6; pl. 9, figure 1). The record of an unknown species of the genus *Ornatomalina*, in cross sections, [32], p. 141, pl. 3, figs. 10-122 from Italy), and [25], p. 6, figures. 5.10; 8.4,12; 9.2,10 from Iraq) expands the paleogeographic distribution of it from Southern Tethys (Pakistan, UAE, Qatar, Iraq, Saudi Arabia and Nigeria) to Northern Tethys (Italy) (Figure 2).

Subfamily Pararotaliinae Reiss, 1963

Genus *Pararotalia* Le Calvez, 1949Type species *Rotalia inermis* Terquem, 1882***Pararotalia khirthari* Haque, 1960 (Pl. 2, figure 18)**1960 *Pararotalia khirthari* [7], p. 3, pl. 6, figure 5.2010 *Pararotalia khirthari*; [33], p. 171.

Remarks: This Middle-Late Eocene species has low trochospiral test with axially pointed long spine for each chamber. This diagnostic species was recorded, so far, in Pakistan [7] and UAE [33].

**3. PALEOGEOGRAPHY**

The ancestral Tethys is connected with the ancestral Atlantic and Indian Oceans via Mediterranean Sea [34]. A wider Tethyan connections, as far as the Carpathian and Pakistan was suggested [31]. About 50% (9/18) of the total recorded Pakistanian species in this study are described from Egypt, 22% (4/18) from UAE, 11% (2/18) from Qatar, and only one species from Iraq, SA and Jordan. The differences between the number of recorded species in different localities in the Middle East with that in Pakistan may be due to non-detailed or detected faunal studies, or the deficiency of available literatures, or also less homogeneity in the species concept between different authors. The Maastrichtian-Early Eocene *Karrereria fallax* [6] has wide geographic distribution: North Atlantic, France, Tunisia, Egypt and Pakistan. The cosmopolitan planktic foraminiferal species

*Globanomalina luxorensis* [3] is recorded here from Northern Tethys (Spain), and also Southern Tethys (Tunisia, Egypt, Pakistan, Iran, New Zealand).

*Ornatomalina hafeezi* [1] expands its paleogeographic distribution from Northern Tethys (Italy) to Southern Tethys (Pakistan, UAE, Qatar, Iraq, Saudi Arabia, Nigeria). *Textularia punjabensis* [1] are recorded from Pakistan, India, Iran, Egypt and France. *Siphogaudryina daviesi* [1] and *Pseudoclavulina farafraensis* [2] is are recorded from Pakistan, UAE, Qatar and Egypt. *Tritaxia elongata* [1], *T. limbata* [1], *Valvulineria nammalensis* [1] and *Pararotalia khirthari* [7] are recorded in both Pakistan and UAE. *Fursenkoina dubia* [1], *Textularia farafraensis* [2], *Cibicoides grandis* [2], *Nonionella haquei* Anan, n. sp., are recorded in both Pakistan and Egypt. *Sakhiella nammalensis* [1] and *Discorbis globiformis* [4] are recorded in Pakistan and Qatar. *Siphogaudryina elongata* [1] is recorded in Pakistan and Jordan. *Cibicoides nammalensis* [1] is recorded in Pakistan, Iraq and France.

**4. SUMMARY AND CONCLUSIONS**

The analysis of the eighteen Pakistanian benthic foraminiferal taxa in this study led to the following conclusions: Haque [1] noted that the Ranikot beds of Pakistan may be correlated to the Esna Shale (Paleocene-Early Eocene) of Egypt. He also noted that many foraminiferal forms which were recorded from Europe, America and Egypt are also recorded in the Laki formation of Pakistan. This study emphasizes the interpretations that have been presented by different authors about the extended realms of Indo-Pacific via ancestral Tethys, which was connected with the ancestral Atlantic Ocean [33]. Due to the high abundance of pelagic Pakistanian foraminiferal assemblage indicate open connections to the Tethys and represents middle-outer neritic environment (100-200 m depth) and shows an affinity with "Midway-Type Fauna" of Berggren & Aubert [36]. About 50% of the total recorded Pakistanian species in this study are described in Egypt, but less of that number are from UAE, Qatar, Iraq, SA and Jordan, which may be due to non-detailed or detected faunal studies, or the deficiency of available literatures, or also less homogeneity in the species concept between different authors. Moreover, one of the illustrated species is believed here to be new: *Nonionella haquei* Anan.

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