International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Contribution to the Paleontology, Stratigraphy and Paleoenvironment of Ten Diagnostic Egyptian Benthic Foraminifera

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Abstract: ***Ten Maastrichtian-Early Eocene diagnostic benthic foraminiferal species from Egypt were recorded and illustrated in this study, for the first time, from Abu Zenima section, west central Sinai of Egypt, but not recorded outside Egypt in other localities in the Tethys. These species are: Höglundina esnaensis (LeRoy, 1953),Eouvigerina aegyptiaca Nakkady (1950),Valvulineria sp. cf. brotzeni Nakkady and Talaat (1959),Eponides marieiSaid and Kenawy (1956),Eponides sigali Said and Kenawy (1956), Trochulina aegyptiaca (LeRoy, 1953), Cibicidoides grandis (LeRoy, 1953),Anomalinoides sinaensis Said and Kenawy (1956),Stensiöina esnehensis Nakkady (1950), Angulogavelinella nekhliana (Said and Kenawy, 1956).The paleontology, stratigraphy andpaleoenvironment of these species are presented.***

Keywords: Paleontology, paleoenvironment, stratigraphy, benthic foraminifera, Egypt, Tethys

1. Introduction

Detailed seven distinguished facies were presented by Issawi *et al*. (1999), from north to south of Egypt: Sinai Facies (SF), North Western Desert Facies (NWDF), Ataqa Facies (AF), Southern Galal Facies (SGF) all of them in the north; Farafra Bahariya Facies (FBF) and Nile Valley Facies (NVF) in the center; and Nuba Abu Ballas Facies (NABF) and each facies of them has certain formations (which differ from the adjacent one) though some formations may cross the boundaries between two contiguous facies (Fig. 1). Issawi and Osman (2000) also noted that during theCretaceous and Tertiary span of time, the land of Egypt witnessed many phases of transgressions and regressions of Tethys over a paleorelief (highs and lows of Syrian Arcs) by the syntectonic structures, which varied considerably from one place to other, and Lat. 28° N was considered by them to be detected the contact between the deep-water facies in the north and shallower in the south, but Anan (1987) detected that contact at nearly coincides around Lat. 27° N. In the Late Cretaceous-Paleogene time, deep marine sediments were deposited in the north Egypt, whereas gradually becoming shallower and less thick southward to the coeval lithofacies predominated, as mentioned by some authors (i.e. Youssef, 1957; Issawi and Osman, 2000).

2. Previous Studies

More than one hundred Maastrichtian-Paleogene benthic foraminiferal species and subspecies were erectedbysome authors:Nakkady (1950, 1955, 1959), LeRoy (1953) and Said and Kenawy (1956)fromdifferent sections inEgypt: Sinai, Nile Valley, Eastern and Western Deserts of Egypt. Some of these new species are recorded outside the original area outside Egypt in the Northern Tethys(Spain, France, Italy, Turkmenia)andalso in the Southern Tethys(Nigeria, Mali, Tunisia,Libya, Jordan, Iraq, United Arab Emirates,Qatar,Pakistan), i. e.: *Spiroplectinella esnaensis, S. knebeli,Siphogaudryina africana, Pseudoclavulina farafraensis, Spiroplectinella paracarinata, Verneuilina aegyptiaca, Tritaxia barakai, Palmula woodi, Aragonia semireticulata, Orthokarstenia oveyi,Cibicidoides abudurbensis, C. mellahensis,C. pseudoacutus, Quadrimorphina esnehensis, Trifarina esnaensis, Anomalinoides aegyptiacus, Arenobulimina aegyptiaca*, while other ten Egyptian diagnostic Maastrichtian-Paleogene benthic foraminiferal species are not recorded (or neglected or identified by another names by other authors in different localities in the Tethysoutside Egypt:*Höglundina esnaensis* (LeRoy, 1953), *Eouvigerina aegyptiaca* Nakkady (1950), *Valvulineria brotzeni* Nakkady and Talaat (in Nakkady, 1959),*Eponides mariei* Said and Kenawy (1956), *Eponides sigali* Said and Kenawy (1956), *Trochulina aegyptiaca* (LeRoy, 1953), *Cibicidoides grandis* (LeRoy, 1953), *Anomalinoides sinaensis* Said and Kenawy (1956), *Stensiöina esnehensis* Nakkady (1950), *Angulogavelinella nekhliana* (Said and Kenawy, 1956).

3. Taxonomy

The micropaleontological studies of the Maastrichtian-Paleogene successionon the Abu Zenima section, west central Sinai of Egypt(Fig. 2) were treated by many authors: i. e. Ghorab (1961),Bassiouni *et al* (1980), Galal (2004), Anan (1992, 2004, 2010, 2014).The taxonomy of Loeblich and Tappan (1988) are followed in this study. These ten neglected species are: *Höglundina esnaensis* (LeRoy, 1953), *Eouvigerina aegyptiaca* Nakkady (1950),*Valvulineria sp. cf. brotzeni* Nakkady and Talaat (in Nakkady, 1959), *Eponides mariei*Saidand Kenawy(1956), *Eponides sigali* Said and Kenawy (1956), *Trochulina aegyptiaca* (LeRoy, 1953), *Cibicidoides grandis* (LeRoy, 1953),*Anomalinoides sinaensis* Said and Kenawy (1956), *Stensiöina esnehensis* Nakkady (1950) and*Angulogavelinella nekhliana* (Said and Kenawy, 1956). These species are illustrated in Figure 3. a-j.

Order: Foraminifera EICHWALD, 1830
Suborder: Robertinina LOEBLICHandTAPPAN, 1984
Superfamily: Ceratobuliminacea CUSHMAN, 1927
Family: Epistominidae WEDEKIND, 1937
Subfamily: Epistomininae WEDEKIND, 1937

Genus:*Hoeglundina* BROTZEN, 1940
Type species:*Rotalia elegans*D'ORBIGNY, 1826
Höglundina esnaensis (LEROY, 1953)
Fig. 3.a

1953 *Epistomina esnaensis* LEROY, p. 29, pl. 5, figs 7-9.
1956 *Höglundina esnaensis*;SAID and KENAWY, p. 152, pl. 6, fig. 14.
1996 *Höglundina esnaensis*;AREF and YOUSSEF, p. 552.
2001 *Epistomina esnaensis*;HEWAIDY and STROUGO, p. 11, fig. 6.
2008*Höglundina esnaensis*;ANAN, p. 363.

Remarks:Loeblich and Tappan(1988, p. 446) considered the genus *Epistomina* Salaj (1984) as a junior synonym of the genus*Höglundina*.*H. esnaensis* is characterized by more convex ventral than dorsal side, 7-8 chambers in the last whorl, sutures ventrally near straight andmainly flush, aperture at the base of last chamber with smooth surface. This species differs from *E. eocenica* Cushman and Hanna (1927) by less conspicuous ventral sutures and by being more punctate. It was originally described from the Early Eocene of Maqfi section, Egypt (Fig. 1.8), and later on from the Paleocene of northern Sinaiandthe Red Sea coast. It is illustrated in this study for the first time from Egypt. ThisPaleocene-Early Eocenespecies seems, so far, to be confined inEgypt.

Suborder: Rotaliina DELAGEandHÉROUARD, 1896
Superfamily: Eouvigerinacea CUSHMAN, 1927
Family: Eouvigerinidae CUSHMAN, 1927
Genus:*Eouvigerina*CUSHMAN, 1926
Type species:*Eouvigerina americana*CUSHMAN, 1926
*Eouvigerina aegyptiaca*NAKKADY, 1950
Fig. 3.b

1950*Eouvigerina aegyptiaca*NAKKADY, p. 686, pl. 89, fig. 18.
1956*Eouvigerina aegyptiaca*; SAID and KENAWY, p. 141, pl. 4, fig. 2.
1965*Eouvigerina aegyptiaca*; KRASHENINNIKOV and PONIKAROV, p. 5.
1994*Eouvigerina aegyptiaca*;HEWAIDY, p. 64, fig. 11. 5; p. 68, fig. 13. 2, 3.
2009*Eouvigerina aegyptiaca*;ANAN, p. 37.

Remarks:The test of *Eouvigerina aegyptiaca*is elongate, slender tapering at both ends with smoothwall, greatest width formed by last chamber, the biserial portion constitutes about one-third the length of the test and later chambers become uniserial, aperture rounded at the end of a short cylindrical neck. It differs from *E. gracilis* Cushman(1926)in having non-spinose surface, in the presence of a groove on either side of the last chamberand semi-rounded final chamber not elongated shape with elongate neck ended with small lip. On the other hand, Speijer (1994) noted that*E. aegyptiaca* possibly should be regarded as senior synonym of *E. subsculptura* McNeil and Caldwell (1981), but unfortunately the type description of *E. aegyptiaca* is not very clear. This species was originally described from the Maastrichtian rocks of Sinai andRed Sea coast. Later on it was recorded in many sites of Egypt by different authors: Western Desert, Nile Valley, Kharga Oasis and southwest Aswan.

Superfamily: Discorbacea EHRENBERG, 1838
Family: Bagginidae CUSHMAN, 1927
Subfamily: Baggininae CUSHMAN, 1927
Genus:*Valvulineria* CUSHMAN, 1926
Type species:*Valvulineria californica* CUSHMAN, 1926
Valvulineria sp. cf. *brotzeni*NAKKADY and TALAAT, 1959
Fig. 3.c

1959*Valvulineria brotzeni* NAKKADY, p. 460, pl. 7, fig. 2.
1965*Valvulineria brotzeni*;KRASHENINNIKOV and PONIKAROV, p. 6.
2009*Valvulineria brotzeni*;ANAN, p. 39, pl. 1, fig. 9.

Remarks:Nakkady (1959) put the figured specimens *Gyroidina planulata* of bothLeRoy(1953, p. 35, pl. 11, figs. 1-3) and Said and Kenawy (1956, p. 149, pl. 5, fig. 8; *non* Cushman and Renz, 1941, p. 23, pl. 4, fig. 1) in the synonym of *Valvulineriabrotzeni* Nakkady andTalaat (in Nakkady, 1959).This species has biconvex smooth test and the dorsal side slightly more convex than the ventral, last chamber extending more toward the umbilicus than the other, sutures very slightly depressed or flush with the surface, aperture a slit and extending from the umbilicus to near the dorsal edge beneath a very thin lip. It is very similar to *V. laevis*Brotzen (1948) but differs by its more convex dorsal side, the triangular apertural faceand narrower umbilical area.The recorded specimen in our material does not match with the holotype provided by Nakkady and Talaat. Therefore, the *Valvulineria* sp. cf. *brotzeni* is recorded andillustrated from thestudied section for the first time.Thiswas originally described from the Paleocene of Um Elghanayem section (Fig. 1.11).Later on,it was recorded in the same stratigraphic horizon of Gabal Aweina(Fig. 1.10),but the Maastrichtian succession of both Abu Tartur section andEl Qusaima section, Sinai, Egypt (Fig. 1.1).

Family: Eponididae HOFKER, 1951
Genus:*Eponides*DE MONTFORT, 1808
Type species:*Nautilus repandus*FICHTEL and MOLL, 1798
*Eponides mariei*SAID and KENAWY, 1956
Fig. 3.d

1956*Eponides mariei* SAID and KENAWY, p. 148, pl. 5, fig. 2.
1995*Eponides mariei*; Ismail and El Saadany, p. 199, fig. 12. 3.
2012*Eponides mariei*; ANAN, p. 25, pl. 1, fig. 13.

Remarks:The species has biconvex test with rounded periphery, 5-6 chambers in the adult whorl. *Oridorsalismariei* of Nomura and Brohi (1995) from Pakistan has small secondary openings occur at the junction of spiral and interiomarginal sutures on the spiral side, which don's not exist in the speciesof Said and Kenawy (1956). This species was originally recorded in the Maastrichtian-Danian rocks of Giddi section of Sinai (Fig. 1.2), and later on in the Maastrichtian of El Qusaima (Fig. 1.1)and El Hassana,Sinai. It seems that this species, so far, is confined in Sinai of Egypt.

Eponides sigali SAID and KENAWY, 1956
Fig.3.e

1956*Eponides sigali* SAID and KENAWY, p. 148, pl. 5, fig. 6.
1992*Eponides sigali*;ISMAIL, p. 238, pl. 2, fig. 4.
2012*Eponides sigali*;ANAN, p. 25.

Remarks:This species is characterized by its large biconvex test with rounded periphery, 7 chambers in the adult whorl, aperture ventral and elongate between the umbilicus and periphery, without supplementary apertures. Speijer (1994) treated this species as junior synonym of *Eponides plummerae* Cushman (1948)and related it to the genus *Oridorsalis*(*O.plummerae*), due to theexistence of the secondary apertures on the spiral side,while Bolli *et al*. (1994) noted that the Campanian-Paleocene species *Gyroidinoides girardanus* (Reuss, 1851) may is possible a senior synonym of the Maastrichtian *Eponides sigali* Said and Kenawy (1956). It was originally recorded in the Maastrichtian rocks of Nekhl section of Sinai (Fig. 1.2),and later on from Sufr El Dara section (Fig. 1.7), west Gulf of Suez, Egypt.
Family: Discorbidae EHRENBERG, 1838
Genus:*Trochulina* D'ORBIGNY, 1839
Trochulina aegyptiaca(LEROY, 1953)
Fig. 3.f

1953*Rotorbinella aegyptiaca* LEROY, p. 48, pl. 7, figs. 1-3.

Remarks:Loeblich and Tappan (1988) considered the genus *Rotorbinella* Bandy (1944) as a junior synonym of the genus *Trochulina*). Test of this species is nearly circular with nearly flat ventrally, but strongly convex dorsally, dorsal sutures oblique and depressed, but mainly flush in the ventral side, aperture a slit at base of septal face between periphery and umbilical plug. It is related to*T. colliculus* (Bandy, 1944) but differs by its deep depressed ventral sutures and being more compressed.The Early Eocene*T. aegyptiaca*is recorded and illustrated for the first time in this study (Fig. 1.4) outside the original description fromMaqfi section (Fig. 1.8), Western Desert of Egypt.

Superfamily: Discorbinellacea SIGAL, 1952
Family: Parrelloididae HOFKER, 1956
Genus:*Cibicidoides*THALMANN, 1939
Type species:*Truncatulina mundula* BRADY, PARKER and JONES, 1890
Cibicidoides grandis(LEROY, 1953)
Fig. 3.g

1953*Anomalina grandis*LEROY, p. 18, pl. 9, figs. 6-8.

Remarks: According to Loeblich and Tappan (1988) the genus *Cibicidoides* Thalmann has a low interiomarginal and equatorial arch at the base of the apertural face. The *grandis* LeRoy specieshas nearly peripheral aperture, then it belongs tothe genus *Cibicidoides*.This species has nearly equal biconvex, about 12 chambers in the last whorl increasing gradually as added, periphery rounded, wall rather coarsely perforated. TheMaastrichtian*C. grandis*is recorded and illustrated for the first time in this study (Fig. 1.4) outside the original description from Maqfi section (Fig. 1.8), Egypt.

Family: Heterolepidae GONZÁLES-DONOSO, 1969
Genus:*Anomalinoides* BROTZEN, 1942
Type species:*Anomalinoides plummerae* BROTZEN, 1942
*Anomalinoides sinaensis*SAID and KENAWY, 1956
Fig. 3.h

1956*Anomalinoides sinaensis*SAID and KENAWY, p. 154, pl. 7, fig. 3.

Remarks:*Anomalinoides sinaensis*is characterized by its biconvex and compressed test, ventral and dorsal umbilical regions somewhat hollowed, sutures curved and depressed, aperture interiomarginal but extending dorsally to the umbilicus. This Sinai Maastrichtian-Paleocene species is similar to the Early Eocene*A. aegyptiaca* (LeRoy, 1953), but differs from Maqfi section, Western Desert of Egypt (Fig. 1.8) by its character of the interiomarginal aperture, more compressed test, more depressed dorsal umbilicus and the different stratigraphic ranges of the two species. The Sinai Maastrichtian-Paleocene*A. sinaensis*is recorded and illustrated for the first time in this study (Fig. 1.4) outside the original description from Maqfi section (Fig. 1.8), Egypt.

Family: Gavelinellidae HOFKER, 1956
Subfamily: Gyroidinoidinae SAIDOVA, 1981
Genus:*Stensiöina* BROTZEN, 1936
Type species:*Rotalia exsculpta* REUSS, 1860
*Stensiöina esnehensis*NAKKADY, 1950
Fig. 3.i

1950*Stensiöina esnehensis*NAKKADY, p. 689, pl. 90, figs. 8-10.
1987*Stensiöina esnehensis*;ANAN, p. 223.

Remarks:*Stensiöina esnehensis*has planoconvex test, about 2 whorls visible on the flat dorsal side with raised and ornate sutures, ventral sutures slightly raised and gently curved, aperture an arched slit at base of chamber on ventral side. This species is similar to *S. excolata* (Cushman, 1940), but differs in the smooth ventral side and distinct chambers. Speijer (1994) treated this species as a junior synonym of *S. pommerana* Brotzen (1936), but the latter species has thicker ridges on the spiral sutures, large pores and umbilical flaps on the umbilical side.*S. esnehensis*was originally described by Nakkady (1950) from the Maastrichtian Wadi Danilisection, Sinai (Fig. 1.3). It does not recorded, so far, outside the original record, except Jiran El Ful section (Fig. 1.5), west Cairo by Anan (1987).

Superfamily: Chilostomellacea BANDY, 1881
Family: Gavelinellidae HOFKER, 1956
Subfamily: Gavelinellinae HOFKER, 1956
Genus:*Angulogavelinella* HOFKER, 1957
Type species:*Discorbina gracilis* MARSSON, 1878
Angulogavelinella nekhliana (SAID and KENAWY, 1956)
Fig. 3.j

1956*Cibicides nekhlianus* SAID and KENAWY, p. 155, pl. 7, fig. 9.
1987 *Angulogavelinella nekhliana*; ANAN, p. 222, pl. 1, fig. 18.

1995.*Cibicides nekhlianus*; ISMAILandEL SAADANY, p. 200, fig. 12. 13.
2002.*Cibicides nekhlianus*; ISMAIL, p. 526, pl. 2, fig. 7.
2004.*Angulogavelinella nekhliana*; ANAN, p. 50, pl. 1, fig. 15.
2012.*Angulogavelinella nekhliana*; ANAN, p. 26, pl. 1, fig. 15.

Remarks:*Angulogavelinella nekhliana*may be recognized by its strong ventral umbo and shell deposits in the central part of the ventral sutures. Anan (1987) considered this species belongs to the genus *Angulogavelinella* due to the type and position of aperture.This species was originally recorded in the Maastrichtian of Nekhl and Giddi sections, Sinai (Fig. 1.2).Later on, it was recorded from other sections in Sinai: El Hassana, Abu Zenima (Fig. 1.4), as well as Jiran El Ful west Cairo (Fig. 1.5). Anan (2004) considered the Maastrichtian *A. nekhliana* with distinct umbilical umbo as the former species of the Paleocene *A. avnimelechi* (Reiss) species, due to lacks this umbo and has moderately deep and open umbilicus. For that he treated these two species in *Angulogavelinellanekhliana –A. avnimelechi* lineage.

4. Paleoenvironment and Paleogeography

1) LeRoy (1953) noted that in certain respects the microfauna of the Esna Shale ofMaqfi section (Fig. 1.10) exhibits an affinity with the Midway Type Fauna (MTF)of the American Gulf Coastal area. Also Berggren (1974) and Berggren andAubert (1975) considered the faunal assemblage of Maqfi section (hererepresents the Farafra Bahariya Facies, FBF of Issawi et al.,1999) to bepredominantly related to the "Midway-type fauna, MTF", middle-outer neriticenvironment (50-200 m).
2) Said and Kenawy (1956) described and recorded 263 benthic foraminiferal speciesfrom the Upper Cretaceous-Lower Tertiary strata of the two sections (Nekhl andGiddi) in northern Sinai, Egypt. These taxa shown an affinity with Midwayfaunas of American Gulf Coastal Plain, which indicate a similarity with fauna ofTrinidad and Tampico Embayment of Mexico (about 70%), together with a fewforms from northern Europe.
3) Berggren and Aubert (1975) noted that the Lower Tertiary fauna of Said and Kenawy(1956) in the northern part of Sinai Peninsula (represents the Sinai Facies,SF) shows an affinity with the MTF.
4) Anan and Hewaidy (1986) considered the Nile Valley Facies (NVF,represented by Duwi section)also related tothe MTF. It means that most northern and central Egypt, according to theseauthors, shows an affinity with the MTF, middle-outer neritic environment (50-200m).
5) Keller (1992) also noted that based on foraminiferal morphotype distributionalpatterns in the Negev-Sinai fauna (=SF) across the K-T boundary have strongsurvivorship preference for species of epifaunal habitat.
6) Anan (1992) noted that theMaastrichtian to Ypresian stratigraphic section of Abu Zenima (Fig. 1.4) is a product of eustasy, tectonics and pattern of sedimentation.
7) Anan (1993) noted that the Maastrichtian benthic foraminiferal species of QarnEl Barr section (UAE) and some other sections in Iraq, Jordan and Egypt areclosest to the Maastrichtian fauna of Nekhl section, Sinai of Egypt (Fig. 1.2). TheMaastrichtian chalk of Jiran El Ful section (Fig.1:5) may indicative to openmarine middle-outer neritic environment.
8) Schmitz et al. (1996) and Speijer et al.(2000) noted that the high abundance ofpelagic microfossils in four studied sections: Wadi Nukhul in north Egypt (SF),Qreiya, Aweina and Duwi sections in central Egypt (NVF) indicated openconnections to the Tethys. Wadi Nukhul section (SF) represent deep depression,bathyal environment (500-600 m) and Gabal Qreiya (Fig. 1.10)and Aweina sections atEastern Desert of Egypt at Upper Nile (NVF) represent outer neriticenvironment (150-200 m), while Gabal Duwi (Fig. 1.9) at Red Sea coast (NVF) representsmiddle-neritic environment (75-100 m).
9) Issawi et al.(1999) considered the contact between the deep and shallowmarine facies in Egypt nearly coincides with Lat. 28º N, but around Lat. 27º N byAnan (1987).
10) Issawi and Osman (2000) noted that deep marine sediments deposited in thenorthern Egypt during the Cretaceous, whereas gradually becoming shallowerand less thick to the coeval lithofacies predominated.
11) Anan (2011) noted that the probable environment for the Sinai Facies (SF, in thenorthern Egypt, which represented by Nekhl, Giddi(Fig. 1:2)and Abu Zenimasection(Fig. 1:4) is outer neritic-upper bathyal (200-400 m), which it deeperthan the following facies: the North Western Desert Facies (Jiran El Ful, Fig.1:5), Farafra Bahariya Facies (Maqfi, Fig. 1:8) and Nile Valley Facies (Duwi,Fig. 1:9) in central Egypt, which are deposited in the middle-outer neritic (75-200 m).

5. Acknowledgements

The author would like to express his thanks to Prof. Hanspeter Luterbacher, Tübingen Univ., Germany for kind help in photography the study species.

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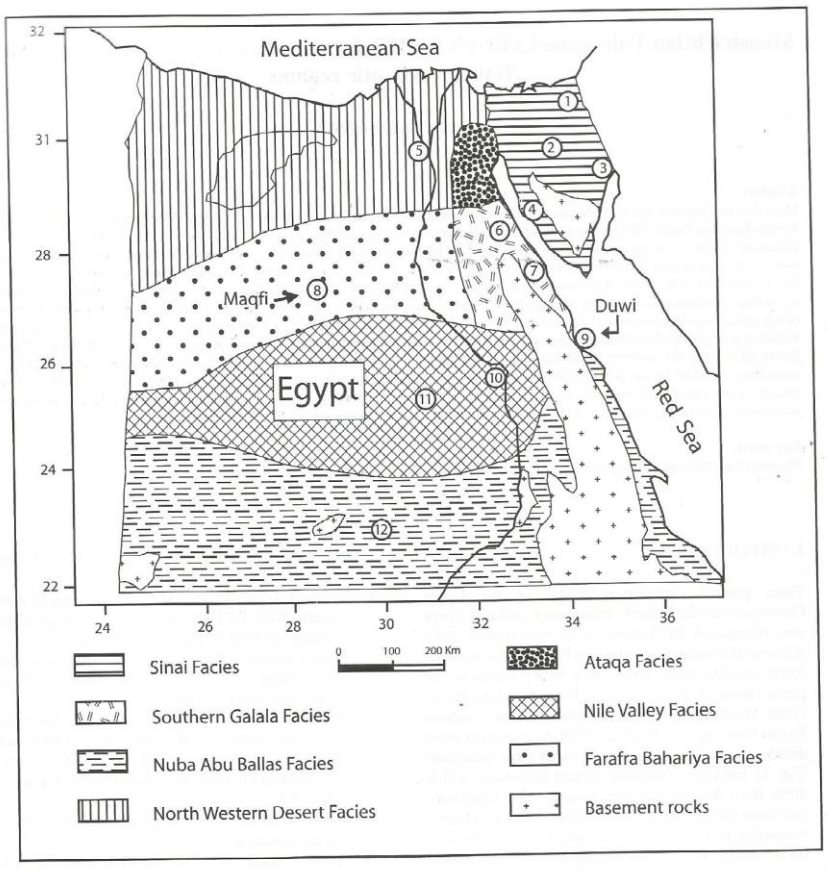

Figure 1: Location map of different Upper Cretaceous facies in Egypt (after Issawi et al., 1999, with some modifications). The numbers are locations of the sections: Sinai Facies (SF: 1. Qusaima; 2. Nekhl and Giddi; 3. Wadi Danili, Taba; 4. Ekma, Samra, Abu Zenima sections). North Western Desert Facies (NWDF: 5. Jiran El Ful section). Southern Galala Facies (SGF: 6. Wadi Ed Dakhl, 7. Wadi Mellaha, Sufr El Dara sections). Farafra Bahariya Facies (FBF: 8. Maqfi, Gunna, Esheikh Marzouk, Twin Spikes sections). Nile Valley Facies (NVF: 9. Duwi, 10. Gurnah, Qreiya,Aweina/Dababiya; 11. Ain Dabadib/Ain Amur, Um Elghanayem, Abu Tartur, Ghanima sections). Nuba Abu Ballas Facies (NABF: 12. Bir Kiseiba, Kurkur, Dungul area), after Anan, 2008.

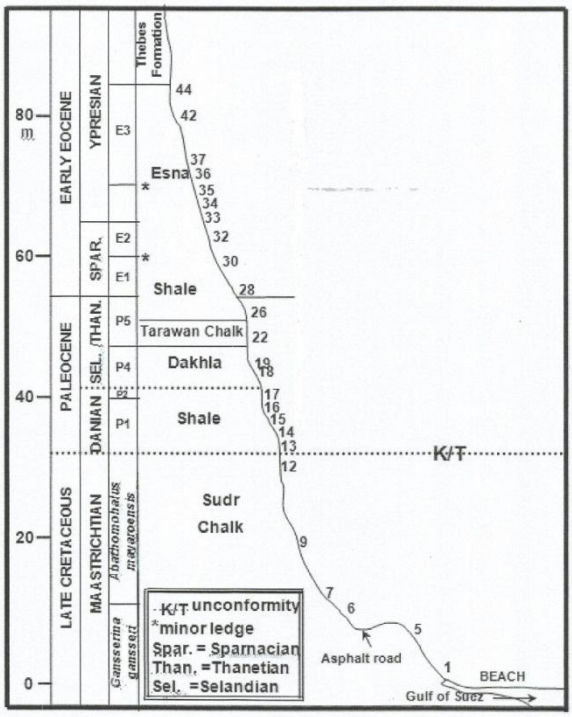

Figure 2: Litho-and biostratigraphy of Abu Zenima section, west central Sinai, Egypt (The planktic foraminiferal zones after Berggren and Pearson, 2005).

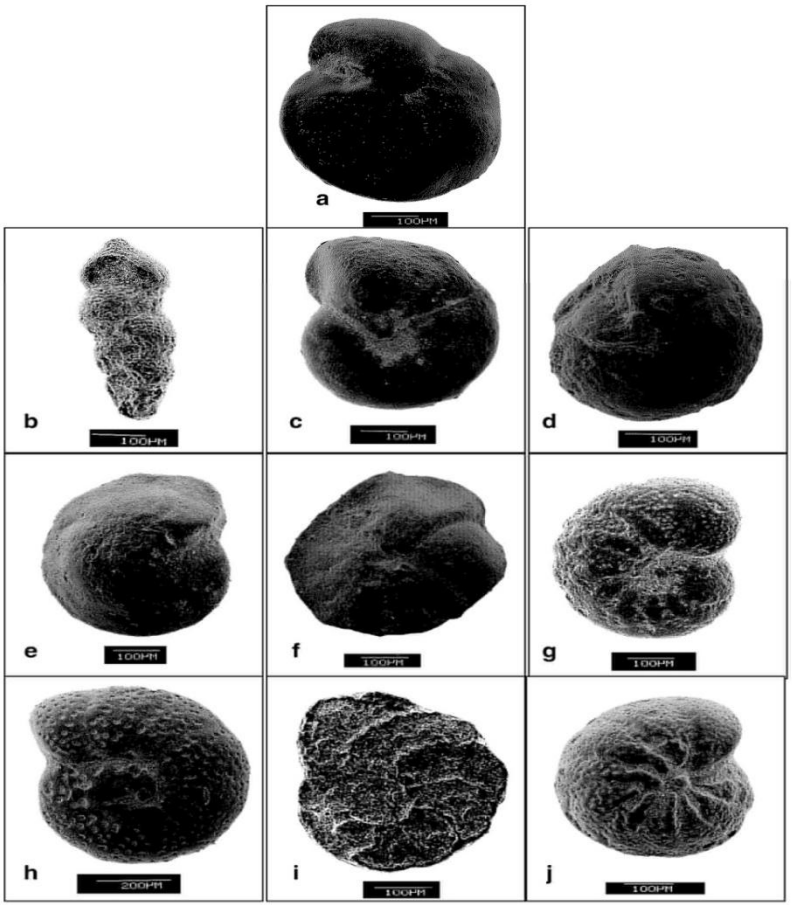

Figure 3: a. *Höglundina esnaensis* (LeRoy, 1953), sample 10;**b**. *Eouvigerina aegyptiaca* Nakkady (1950), s. 10;**c**. *Valvulineria brotzeni* Nakkady and Talaat (1959), s. 7;**d**. *Eponides mariei*Said and Kenawy (1956), s. 9;**e**. *Eponides sigali* Said and Kenawy (1956), s. 6; **f**. *Trochulina aegyptiaca* (LeRoy, 1953), s. 32; **g**. *Cibicidoides grandis* (LeRoy, 1953), s. 10;**h**. *Anomalinoides sinaensis* Said and Kenawy (1956), s. 11;**i**. *Stensiöina esnehensis* Nakkady (1950), s. 5; **j.** *Angulogavelinella nekhliana* (Said and Kenawy, 1956), s 12.**.**