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RESEARCH ARTICLE

TETHYAN BARTONIAN-PRIABONIAN DIAGNOSTIC BENTHIC FORAMINIFERA PART I: SUBORDER TEXTULARIINA

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ABSTRACT

This study describes and illustrates the seventy three agglutinated benthic foraminiferal species of the Suborder Textulariina across the Bartonian-Priabonian belonging to thirty seven genera from twenty one countries in the Norther Tethys (USA, England, France, Spain, Belgium, Germany, Poland, Hungaria, Slovenia, Romania, Czech, Italy) and Southern Tethys (Angola, Tanzania, Tunisia, Egypt, Iraq, Qatar, United Arab Emirates (UAE), Pakistan, Japan, New Zealand) have been studied. The modern taxonomical consideration of the species is used. The recorded species were previously noted in different literatures, while eight of them are believed here as new: *Bathysiphon usamai*, *Asanospira franciana*, *Paratrochamminoides spainica*, *Verneuilina hungariana*, *Martinottiella cimermani*, *Textularia karimae, Cylindroclavulina spainica* and *Tritaxilina ozsvárti.* The foraminiferal assemblage indicates an open marine environment, which represents outer shelf-lower bathyal depths of deposition. The current activity not only transported allochthonous taxa, but also brought in refractory organic matter to the seafloor, which were in turn affected by sedimentary and, ultimately, by climatic factors. Most of the recorded species are distributed not only in neighboring localities, but also far from it.

KEYWORDS

Textulariina, Benthic Foraminifera, Bartonian, Priabonian, Northern Tethys, Southern Tethys.

1. INTRODUCTION

Benthic foraminifera are an important source of information on past environmental variability. In this study, an attempt has been made to bring together the seventy-three Bartonian-Priabonian agglutinated benthic foraminiferal species were recorded by many author from twenty one countries in the Northern and Southern Tethys (Figure 1).

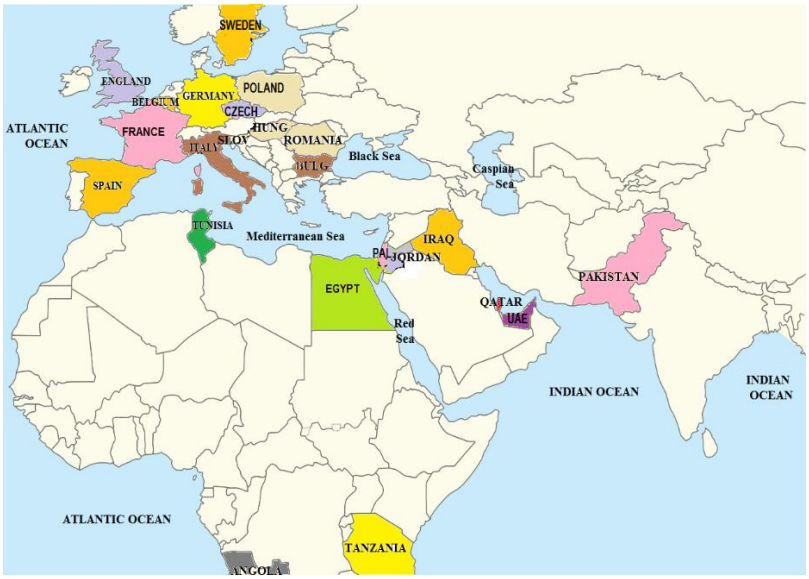

Figure 1: Geographic distribution of the most localities in the Tethys, north and south Mediterranean Sea.

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2. Material of Study

Rich and well-preserved seventy three Bartonian-Priabonian Textulariid agglutinated benthic foraminiferal species from twenty countries in the Northern and Southern Tethys made it possible to elucidate them with modern taxonomical consideration. Following the Code of Zoological Nomenclature, a taxonomic revision of eight species of them are re-described its morphological features and considered here as a new: *Bathysiphon usamai*, *Asanospira franciana*, *Paratrochamminoides spainica*, *Verneuilina hungariana*, *Martinottiella cimermani*, *Textularia karimae, Cylindroclavulina spainica* and *Tritaxilina ozsvárti*..

3. Systematic Paleontology

The taxonomy of Loeblich and Tappan in 1988 is followed here for seventy three Textulariid benthic foraminiferal species, which considered an excellent marker species for the Bartonian-Priabonian in the Northern and Southern Tethys (Loeblich and Tappan, 1988). The new taxonomic considerations and evolutionary lineages are used for some of the recorded species. The species are illustrated in Plate 1.

3.1 Plate 1

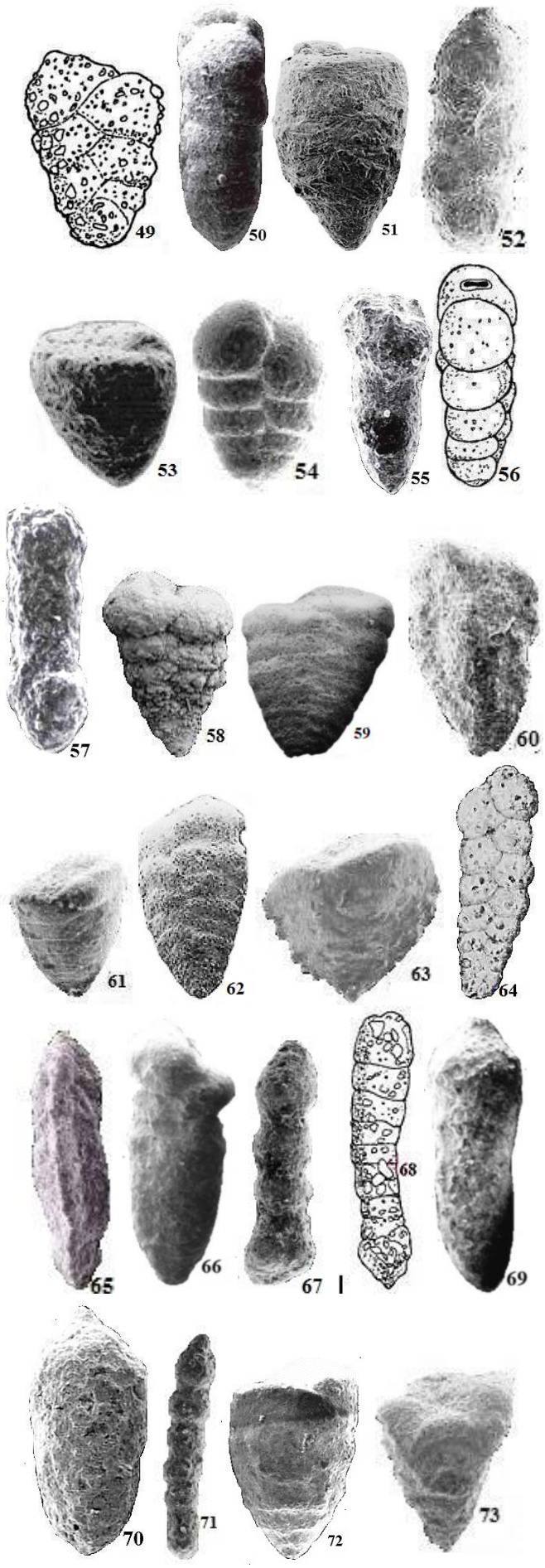

Figure 1: *Astrorhiza bakonycsernyensis* Ozsvárt (2007), **2.** *Astrorhizinulla cylindrica* (Glaessner, 1937), **3.** *Pseudonodosinella elongata* (Grzybowski, 1898), **4.** *Bathysiphon eocenica* Cushman & Hanna (1927), **5.** *Bathysiphon saidi* (Anan,1994), **6.** *Bathysiphon taurinensis* Sacco (1893**), 7.** *Bathysiphon usamai* Anan, n. sp., **8.** *Rhabdammina abyssorum* Sars (1869), **9.** *Rhabdammina linearis* Brady (1879), **10.** *Orbulinelloides agglutinatus* Saidova (1970), **11.** *Orbulinelloides arabicus* Anan (2003), **12.** *Orbulinoides kaminskii* Anan (2021), **13.** *Orbulinoides sztrakosae* Anan (2021), **14.** *Orbulinoides testacea* (Flint, 1899). **15.** *Ammodiscus cretaceous* (Reuss, 1845), **16.** *Ammodiscus incertus* (d'Orbigny, 1839), **17.** *Ammodiscus latus* Grzybowski (1898), **18.** *Glomospira gordialis* (Jones & Parker,1860), **19.** *Miliammina kenawyi* Anan (1994), **20.** *Reophax globosus* Sliter (1968), **21.** *Asanospira franciana* Anan, n. sp., **22.** *Haplophragmoides walteri* (Grzybowski, 1898), **23.** *Lituotuba lituiformis* (Brady, 1879), **24.** *Paratrochamminoides spainica* Anan, n. sp., **25.** *Reticulophragmium amplectens* (Grzybowski, 1898)**, 26.** *Ammobaculites agglutinans* (d'Orbigny, 1846), **27.** *Ammobaculites cubensis* Cushman & Bermudez (1937), **28.** *Ammobaculites originalis* Mjatliuk (1970), **29.** *Recurvoides anormis* Mjatliuk (1970), **30.** *Popovia beckmanni* (Kaminski & Geroch, 1987), **31.** *Pavonitina biarritzensis* Sztràkos (1987), **32.** *Spiroplectinella carinata* (d'Orbigny, 1846), **33.** *Spiroplectinella dalmatina* (de Witt Puyt, 1941)**, 34.** *Spiroplectinella nuttalli* (Lalicker,1935)**, 35.** *Spiroplectinella pectinata* (Hantken, 1875)**, 36.** *Vulvulina advena* Cushman (1926**), 37.** *Vulvulina haeringensis* (Gümbel,1868)**, 38.** *Vulvulina jarvisi* Cushman (1932), **39.** *Vulvulina spinosa* Cushman (1927**), 40.** *Plectina emiratensis* Anan (2003**), 41.** *Plectina eocenica* Cushman (1936), **42.** *Gaudryina ennakhali* Anan (2022a), **43.** *Gaudryina osmani* Anan (2022a), **44.** *Verneuilina hungariana* Anan, n. sp. **45.** *Tritaxia alpina* (Cushman, 1936), **46.** *Tritaxia kruhelensis* (Woicik, 1903), **47.** *Tritaxia longa* Anan (2023), **48.** *Arenobulimina kaminskii* Anan (2023a**), 49.** *Dorothia eocenica* Cushman (1936), **50.** *Dorothia fallax* Hagn (1956), **51.** *Dorothia nacataensis* (White,1929), **52.** *Dorothia textilaroides* (Hantken, 1875)**, 53.** *Marssonella hafitensis* Anan (2003)**, 54.** *Karreriella bradyi* (Cushman, 1911), **55.** *Karreriella halkyardi* Cushman (1936), **56.** *Karreriella subglabra* (Gümbel, 1870), **57.** *Martinottiella cimermani* Anan, n. sp., **58.** *Textularia agglutinans* d'Orbigny (1839),**59.** *Textularia communis* (d'Orbigny,1826), **60.** *Textularia crookshanki* Haque (1956), **61.** *Textularia deperdita* d'Orbigny (1826), **62.** *Textularia fahmyi* Anan (1994), **63.** *Textularia karimae* Anan n. sp., **64.** *Textularia plummerae* Lalicker (1935), **65.** *Clavulinoides elongata* Haque (1956**), 66.** *Pseudogaudryina textilaroides* (Hantken, 1875), **67.** *Pseudoclavulina trinitatensis* Cushman & Renz (1948), **68.** *Clavulina sztrákosae* Anan (2023b),**69.** *Cylindroclavulina colomi* Hagn (1956), **70.** *Cylindroclavulina rudislosta* (Hantken, 1889), **71.** *Cylindroclavulina spainica* Anan, n. sp., **72.** *Tritaxilina pupa* (Gümbel, 1868), **73.** *Tritaxilina ozsvárti* Anan, n. sp.

3.2 Order Foraminiferida Eichwald, 1830

3.2.1 Suborder Textulariina Delage and Hérouard, 1896

Astrorhiza bakonycsernyensis Ozsvárt (2007), p. 29, plate 1, figure 1. Hungaria.

Astrorhizinulla cylindrica (Glaessner, 1937), p. 354, plate 1, figure 1. Germany, France, Romania, P. Ocean.

Pseudonodosinella elongata (Grzybowski, 1898), p. 279, plate 10, figures 19, 20. Poland, Romania.

Bathysiphon eocenica Cushman and Hanna (1927), p. 210, p1. 13, figures. 2, 3. USA, Caribbean, Italy, Hungaria, UAE.

Bathysiphon saidi **(Anan,1994),** p. 218, figure 8.1. Egypt, UAE, Hungaria.

Bathysiphon taurinensis Sacco (1893), p. 168, plate.11, figure 2. Slovenia.

Bathysiphon usamai Anan, n. sp. (=*Bathysiphon* sp. Kaminski and Huang, 1991, p. 718, plate. 1, figure. 1).

Holotype: Plate 1, Figure 7.

Etymology: after the late Geologist Prof. Usama Zeineddin, Al Azhar University-Gaza, Palestine.

Type locality: Site 767, Leg 124, Celebes Sea, Pacific Ocean **(Figure 2)**.

Stratigraphic level: Eocene-Oligocene.

Diagnosis: This species has an elongate test, wall constructed of firmly cemented fine sand grains with smooth exterior.

Remarks: The new species differs from the Bartonian-Priabonian species *Bathysiphon saidi* Anan by more elongated test, fine wall constructed of firmly cemented fine sands than coarse sand grains with rough exterior.

Rhabdammina abyssorum Sars (1869), p. 248. USA, Germany, France, Italy, Hungaria.

Rhabdammina linearis Brady (1879), p. 37, plate. 3, figures 10, 11. USA, Romania, Offshore Angola.

Orbulinoides agglutinatus Saidova, 1970, p. 164. Pacific Ocean.

Orbulinelloides arabicus Anan (2003), p. 531, figure. 4.1. UAE.

Orbulinelloides kaminskii Anan (2021), p. 55, plate. 1, figure. 5. Pacific Ocean.

Orbulinelloides sztrakosae Anan, 2021, p. 54, plate.1, figure. 6. France.

Orbulinoides testacea (Flint, 1899). USA, Atlantic Ocean.

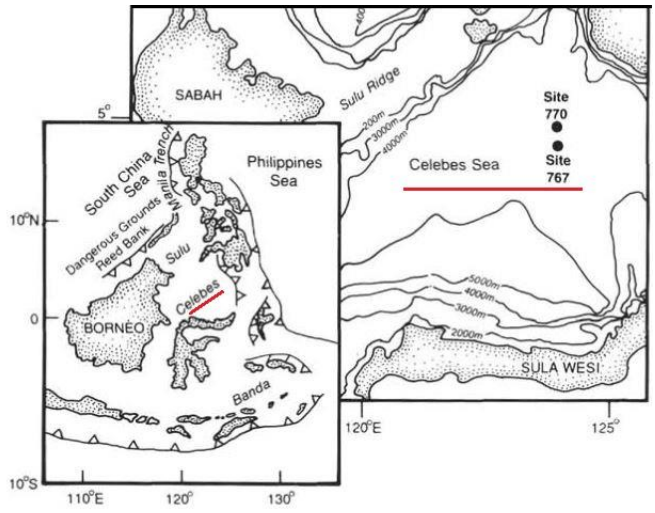

Figure 2: Location map of Site 767, Leg 124, Celebes Sea, Pacific Ocean.

Ammodiscus cretaceous (Reuss, 1845), p. 35, pl. 13, figs. 64,65. Mexico, Caribbean, Atlantic Ocean, Germany, Spain, Poland, Bulgaria, Romania, Czech, Italy, Angola, Tanzania, Tunisia, Egypt, Qatar, UAE, Japan, New Zealand.

Ammodiscus incertus (d'Orbigny, 1839). France, Germany.

Ammodiscus latus Grzybowski (1898), p. 282, pl. 10, figs 27, 28. Poland, Offshore Angola.

Glomospira gordialis (Jones & Parker,1860), p. 304. USA, Canada, Spain, Italy, Russia, Ukraine, Angola, Tunisia, Egypt, UAE.

Miliammina kenawyi Anan, 1994, p. 218, figure 8.2. Egypt, UAE.

Reophax globosus Sliter, 1968, p. 43, pl. 1, figure 12. Mexico, Romania.

Asanospira franciana **Anan, n. sp.** (=*Ammomarginulina* sp. 1, Sztràkos, 2000, p. 76, plate. 1, figure 5).

Holotype: Plate 1, Figure 21.

Etymology: after the Republic of France **(Figure 3)**.

Stratigraphic level: Bartonian.

Diagnosis: Test planispiral involute and compressed, tight umbilicus, wall coarsely agglutinated, aperture a low opening at the base of apertural face.

Remarks: This species has coarsely agglutinated wall, and slit-like aperture at the base of apertural face.

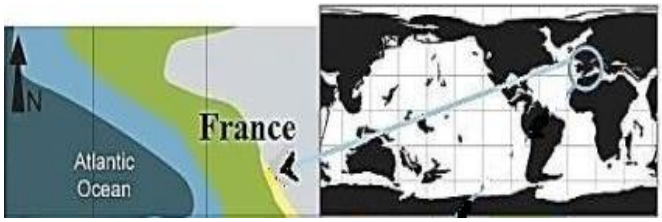

Figure 3: Location map of France, West Europe, east Atlantic Ocean.

Haplophragmoides walteri (Grzybowski,1898), plate 1, figure.4. North Atlantic, Poland, Romania, Offshore Angola, UAE.

Lituotuba lituiformis (Brady, 1879), p. 59, plate 5, figure. 16). USA, Romania.

Paratrochamminoides spainica **Anan, n. sp.** (=*Paratrochamminoides* sp. Molina et al., 2006, p. 281, plate. 2, figure. 23).

Holotype: Plate 1, Figure 24.

Etymology: after the Kingdom of Spain **(Figure 4A)**.

Stratigraphic level: Priabonian **(Figure 4B)**.

Diagnostic: Test enrolled agglutinated of firmly cemented quartz grains, proloculus followed by streptospirally coiled and undivided tubular second chamber, later with numerous ovate to globular chambers per whorl and an abrupt change in coiling, to a planispiral final whorl, aperture rounded.

Remarks: This Priabonian species is distinguished by its enrolled test, streptospirally coiled to a planispiral final whorl. It has a smaller number of the planispiral final whorl, and younger stratigraphic level than the Turonian-Paleocene type species *P. korosmezoensis* (Majzon, 1943). Spain.

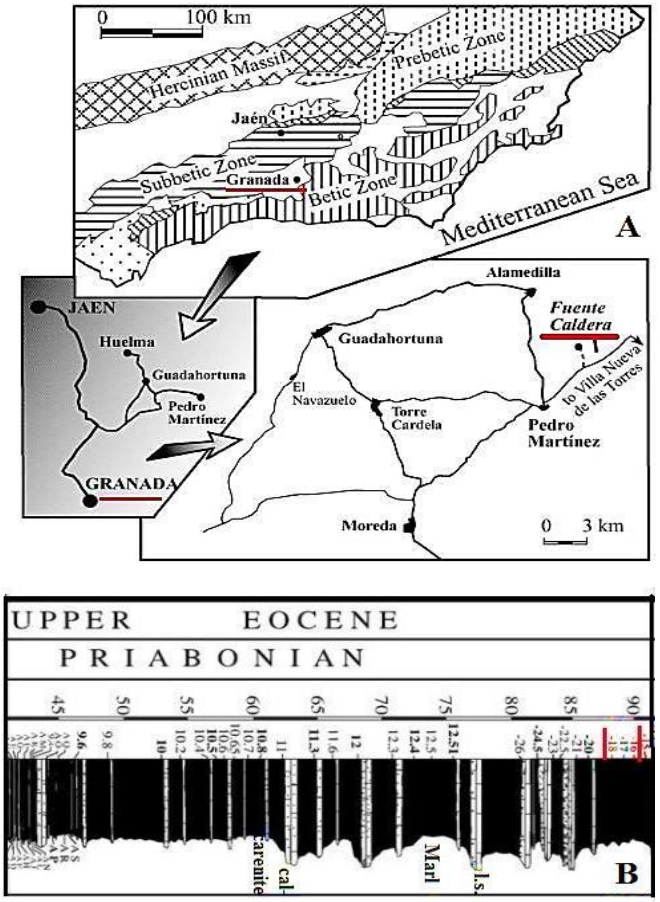

Figure 4: A. Location of the Fuente Caldera section, southern Spain, B. stratigraphic level of *Paratrochamminoides spainica* Anan, n. sp. (after Molina et al, 2006).

Reticulophragmium amplectens (Grzybowski, 1898), p. 292, plate. 12, figures. 1-3. Poland, Spain.

Ammobaculites agglutinans (d'Orbigny, 1846), p.137, plate. 7, figures. 10-12. France, Slovenia.

Ammobaculites cubensis Cushman and Bermudez (1937), p.106, p1ate.16, figures.16-18. Cuba, Egypt, UAE.

Ammobaculites originalis Mjatliuk, 1970, p. 92, plate. 28, figure. 4. Romania.

Recurvoides anormis Mjatliuk, 1970, p. 84, plate 18, figure 4. Romania.

Popovia beckmanni (Kaminski and Geroch, 1987). Romania.

Pavonitina biarritzensis Sztràkos, 1987, p. 129, plate 1, figures 1-3, text-figure 1. France, Slovenia.

Spiroplectinella carinata (d'Orbigny, 1846), p. 247, plate 14, figures 32–34). France, Belgium, Germany, Hungaria.

Spiroplectinella dalmatina (de Witt Puyt, 1941), p. 45, plate 1, figures 4-5. Slovenia, Italy.

Spiroplectinella nuttalli (Lalicker,1935), p. 43, p1ate 6, figures 3,4. Venezuela, Ecuador, Egypt, UAE.

Spiroplectinella pectinata (Hantken, 1875), p. 68, plate 7, figure 10. France, Italy, Slovenia.

Vulvulina advena Cushman, 1926, p. 32, plate 4, figure 9. USA, France, Italy, Slovenia, Hungaria.

Vulvulina haeringensis (Gümbel, 1868), p. 71, plate 2, figure 84. South Atlantic, France, Italy, Slovenia, UAE.

Vulvulina jarvisi Cushman, 1932, p. 84, plate 10, figure 20. USA, Caribbean, Venezuela, North Atlantic, Germany, Hungaria.

Vulvulina spinosa Cushman, 1927, p. 111, plate 23, figure 1. USA, Spain.

Plectina emiratensis Anan, 2003, p.534, figure 4.2. UAE.

Plectina eocenica Cushman, 1936, p. 43, plate 3, figures. 1–3. USA, Italy, Hungaria.

Gaudryina ennakhali Anan, 2022a, p. 8, plate 1, figure 10. Anan (2022) noted that the Ypresian *G. speijeri* Anan is considered as the ancestor of the descendent Lutetian-Briabonian *G. ennakhali*. USA, N. Atlantic, UAE.

Gaudryina osmani Anan, 2022a, p. 8, plate. 1, figure. 14. Anan (2022) noted that the Ypresian *G. ameeri* Anan is considered as the ancestor of the descendent the Lutetian *G. osmani*. USA, N. Atlantic, UAE.

***Verneuilina hungariana* Anan, n. sp**. (=*Verneuilina* sp., Ozsvárt, 2007, p. 34, plate 1, figure 17).

Holotype: Plate 1, Figure 44.

Etymology: after the Republic of Hungaria, east Europe (Figure).

Type locality: SW Bakony–Zala Paleogene Subbasin in the Hungarian Paleogene Basin **(Figure 5)**.

Stratigraphic level: Bartonian-Priabonian **(Figure 6)**.

Diagnosis: Test elongate coarsely agglutinated triserial, triangular in outline and triangular in cross-section, sutures barely visible. scale= 0.95 mm

Remarks: The Maastrichtian-Paleocene *Verneuilina aegyptiaca* Said & Kenawy is considered here as the precursor of the Ypresian *V. luxorensis* (Nakkady) followed by the Bartonian-Priabonian *V. hungariana* Anan, n. sp. the top of the *Verneuilina aegyptiaca* - *V. luxorensis* - *V. hungariana* lineage.

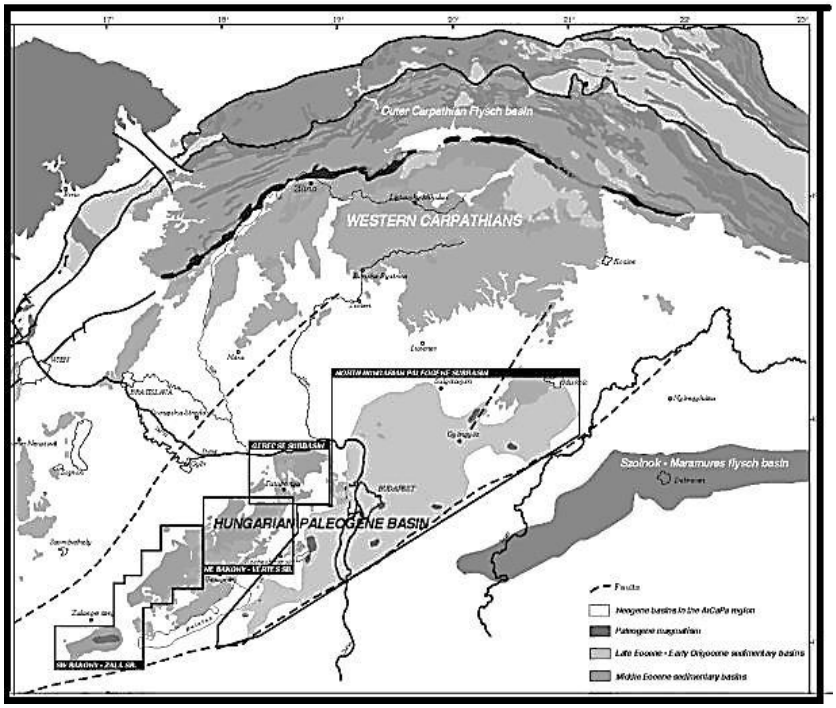

Figure 5: Location map of the Hungarian Paleogene Basin to the south of Western Carpathian (after Ozsvárt, 2007).

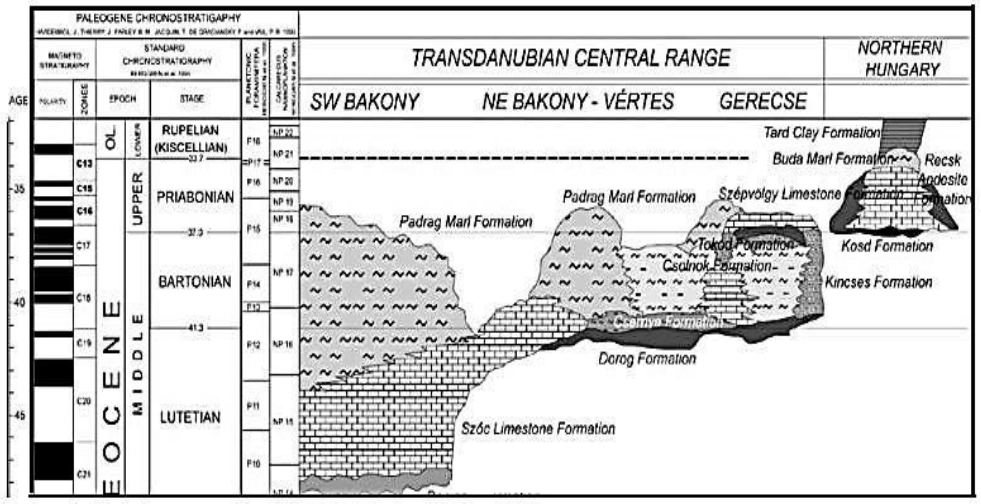

Figure 6: Stratigraphy of the Hungarian Paleogene Basin (after Ozsvárt, 2007).

Tritaxia alpina (Cushman, 1936), p. 22, plate 3, figure 16. USA, Italy, UAE.

Tritaxia kruhelensis (Woicik, 1903), p. 498, pl. 6, fig. 21. Germany, France, Slovenia.

Tritaxia longa (Anan, 2023), p. 39, pl.1, fig. 11. This species has long stratigraphic range from Campanian to Bartonian. USA, Germany, France, Italy, Slovenia, Hungaria, Romania, Iraq.

Arenobulimina kaminskii Anan, 2023a, p.71, plate 1, figure 6. A. Ocean.

Dorothia eocenica Cushman,1936, p. 28, plate 14, figure 14. USA, France.

Dorothia fallax Hagn (1956), p. 119, plate 9, figures 18-19. Germany, Slovenia.

Dorothia nacataensis (White,1929), p. 31, plate 4, figure 2. Mexico, Italy, UAE.

Dorothia textilaroides (Hantken, 1875), p. 12, plate 1, figure. 6) USA, France, Hungaria.

Marssonella hafitensis Anan (2003), p. 535, figure 4.3. UAE.

Karreriella bradyi (Cushman, 1911), p. 67, figure 107. USA, Spain.

Karreriella halkyardi Cushman, 1936, p. 36, plate 5, figure 16. USA, Slovenia.

Karreriella subglabra (Gümbel, 1870), p. 602 plate 1 figure 4. Germany, France.

Martinottiella cimermani Anan, n. sp. **(=*Martinottiella* sp. Cimerman et al, 2006, p. 18, plate 2, figure 5)**.

Holotype: Plate 1, Figure 57.

Etymology: after the Slovenian micropaleontologist Franc Cimerman.

Stratigraphic level: Priabonian of the Socka-Dobrna area and detailed position of studied section, Slovenia (Figure 7 A, B).

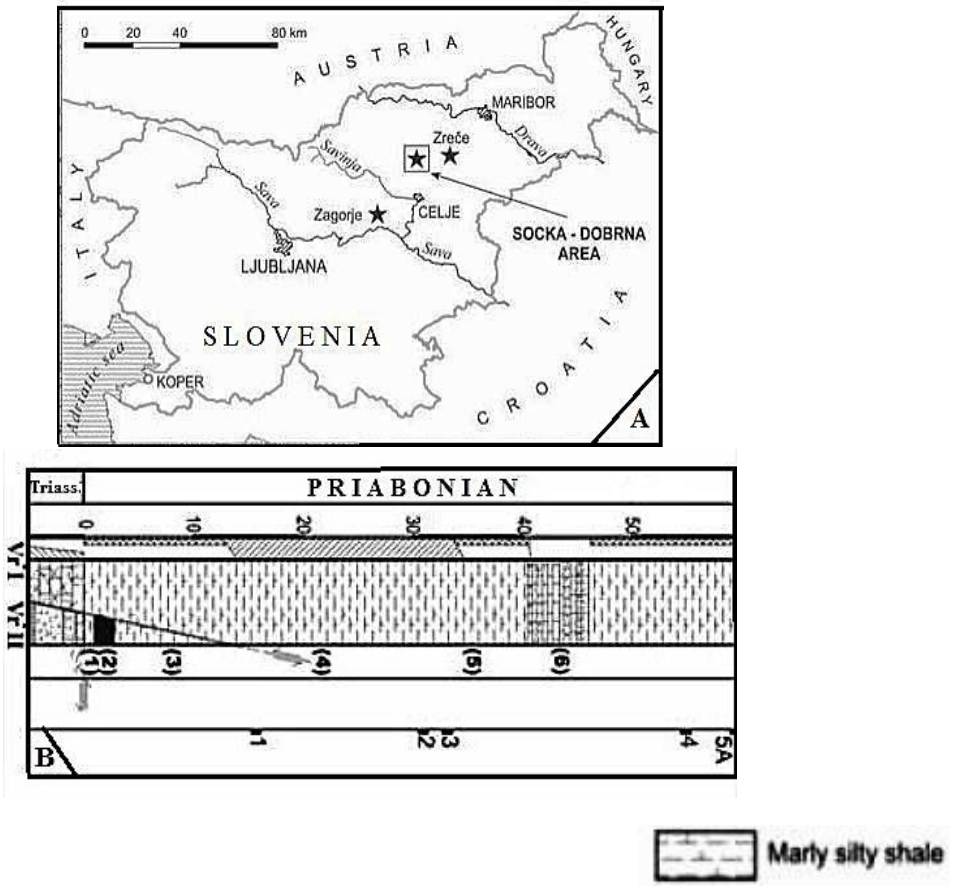

Figure 7: A) Location map of the Vraček study section, Socka-Dobrna area, North Slovenia, B) Priabonian stratigraphy of Vraček section, and sample location of the new species *Martinottiella cimermani*, Vr-004.

Diagnosis: Test elongate, cylindrical coarsely agglutinated, early trochospiral coil, later reduced to triserial, biserial, and a relatively elongate final uniserial stage, aperture terminal.

Remarks: This species is characterized by coarsely agglutinated wall, early trochospiral coil and later triserial to biserial to uniserial end with terminal aperture.

Textularia agglutinans d'Orbigny, 1839, pl. 1, figs. 17, 18, 32–34. France, Egypt.

Textularia communis (d'Orbigny, 1826), p. 263. France, Egypt, UAE.

Textularia crookshanki Haque, 1956, p. 24, pl. 2, fig. 8. Pakistan, France, Hungaria.

Textularia deperdita d'Orbigny (1826). France, Hungaria.

Textularia fahmyi Anan,1994, p. 218, fig. 8.3. Egypt.

Textularia ***karimae*** Anan, n. sp. (=*Textularia* sp. 3, Ozsvárt, 2007, p. 37, plate. 2 figure 13). Hungaria.

Holotype: Plate 1, Figure 63.

Etymology: after my wife Dr. Karima Anan, Leeds University.

Stratigraphic level: Bartonian-Priabonian **(see Figure 5, 6)**.

Diagnosis: Test biserial biconvex finely agglutinated, rapidly flaring chambers towards apertural end, chambers inflated triangular in outline rapidly increasing in size as added, periphery corrugated, sutures barely visible, aperture basal.

Remarks: This new species is characterized by rapidly flaring biserial chambers towards apertural end, and corrugated periphery.

Textularia plummerae Lalicker, 1935, p. 50, plate 6, figure 10. USA, Italy, Norwegian Sea, Poland, UAE.

Clavulinoides elongata Haque, 1956, p. 45, plate 21, figures 13a–b. Pakistan, France, Hungaria.

Pseudogaudryina textilaroides (Hantken, 1875), p. 15, plate 1, figure 6. Germany, Slovenia.

Pseudoclavulina trinitatensis Cushman and Renz, 1948. USA, Spain.

Clavulina sztrákosae Anan, 2023b, p. 33, plate 1, figure 11. France.

Cylindroclavulina colomi Hagn, 1956, p. 123, plate 10, figure 6-7. Germany, Slovenia, Hungaria.

Cylindroclavulina rudislosta (Hantken, 1889), p.383. Germany, France, Slovenia.

***Cylindroclavulina spainica* Anan, n. sp.** (=*Pseudoclavulina* sp. B, Molina et al., 2006, p. 281, plate 2, figure 20).

Holotype: Plate 1, Figure 71.

Etymology: after the Kingdom of Spain.

Stratigraphic level: Priabonian (see Figure 2).

Diagnosis: Test coarsely agglutinated wall, cylindrical short early triserial stage, uniserial stage elongate, aperture rounded, terminal on a neck.

Remarks: This species has coarsely agglutinated wall, cylindrical short early triserial stage, not triangular in cross section than *Pseudoclavulina*.

Tritaxilina pupa (Gümbel, 1868), p. 602, pl. 1, figure. 3. USA, France, Germany, Italy, Hungaria, Egypt.

***Tritaxilina ozsvárti* Anan, n. sp**.

Holotype: Plate 1, Figure 73.

Etymology: after the Hungarian micropaleontologist Peter Ozsvárt.

Stratigraphic level: Bartonian-Priabonian **(see Figures. 5, 6)**.

Diagnosis: Test coarsely agglutinated, triangular in outline rapidly flaring towards apertural end, initially triserial, becoming biserial in adult portion, sutures strongly depressed, aperture interiomarginal slit.

Remarks: this species has coarsely agglutinated test, and strongly depressed sutures.

4. PALEOGEOGRAPHY

The author did not observed that most recorded species assemblage are endemic to the original erection, but distributed along paleogeographic localities in the Northern and Southern Tethys **(Table 1).**

The current activity not only transported allochthonous taxa, but also brought in refractory organic matter to the seafloor, which were in turn affected by sedimentary and, ultimately, by climatic factors. A group researchers, e.g.: Haq and Aubry, Anan, Rögl, Abed, Stassen et al., noted that during the Paleogene Neotethys (~55.8 Ma) the Atlantic was connected with Indian Oceans via Mediterranean Sea (**Figure 8)** (Haq and Aubry;1978; Anan, 1995; Rögl, 1999; Abed; 2013; Stassen et al., 2015).

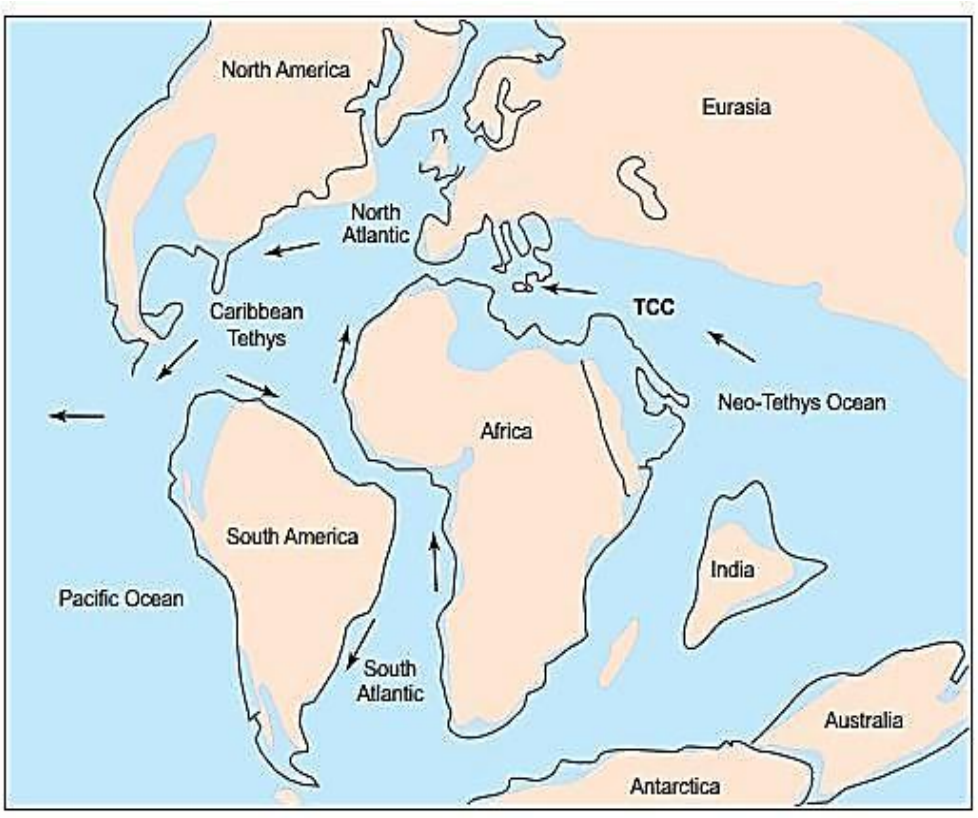

Figure 8: Paleogeography of the Neo-Tethys ocean during the Late Cretaceous-Paleogene times showing the flow direction of the Tethyan Circumglobal Current (TCC) in all directions (after Abed, 2013).

Table 1 shows the identified seventy three Bartonian-Priabonian agglutinated foraminiferal species in the Tethyan twenty one. The following remarks can be presented :

Ammodiscus cretaceous is recorded in a wide geographic Tethyan localities, from North America to East Asia via Europe and Africa: Mexico, Caribbean, Atlantic Ocean, France, Germany, Poland, Romania, Bulgaria, Italy, Angola, Tanzania, Egypt, UAE, Japan and New Zealand., while *Glomospira gordialis* is recorded from seven countries, but *Tritaxia longa* and *Rhabdammina abyssorum* are recorded in five countries.

Many species are recorded from four countries: *Astrorhizinulla cylindrica*, *Spiroplectinella carinata*, and *Textularia plummerae*, while others in three countries: *Plectina eocenica*, *Gaudryina ennakhali*, *G. osmani, Tritaxia kruhelensis*, *Dorothia textilaroides*, *Karreriella halkyardi*, *Textularia communis*, *T. crookshanki, Clavulinoides elongata*, *Cylindroclavulina colomi*, *C. rudislosta.*

Some of the recorded species are endemic, so far, to their original erection: *Astrorhiza bakonycsernyensis, Bathysiphon taurinensis*, *Orbulinelloides agglutinatus*, *O. arabicus, O. kaminskii*, *O. sztrakosae*, *Ammobaculites originalis*, *Recurvoides anormis*, *Popovia beckmanni*, *Plectina emiratensis*, *Arenobulimina kaminskii*, *Marssonella hafitensis*, *Textularia fahmyi*, *Clavulina sztrákosae*.

Eight of the recorded assemblage are considered new species: *Bathysiphon usamai, Asanospira franciana, Paratrochamminoides spainica, Verneuilina hungariana, Martinottiella cimermani, Textularia karimae, Cylindroclavulina spainica, Tritaxilina ozsvárti*.

Table 1: The distribution of the Bartonian-Priabonian benthic foraminiferal species in Some Tethyan Localities. 1:US (USA), MX (Mexico), CR (Caribbean), VZ (Venezuela), AO (Atlantic Ocean), EG (England), SN (Spain), FN (France), BG (Belgium), GM (Germany), PD (Poland), HG (Hungaria), V (Slovenia), RN (Romania), BG (Bulgaria), IT (Italy), AG (Angola), TZ (Tanzania), ET (Egypt), IR (Iraq), UA (United Arab Emirates), PN (Pakistan), JN (Japan), NZ (New Zealand), PO (Pacific Ocean).

Sp. No.	Bartonian-Priabonian Agglutinated species		US	MX	CR	VZ	AO	EG	SN	FN	BG	GM	PD	HG	SV	RN	BG	IT	AG	TZ	TN	ET	IR	UA	PN	JN	NZ	PO
	Genus	species																										
1	*Astrorhiza*	*bakonycserny.*												x														
2	*Astrorhizinulla*	*cylindrica*								x		x				x												x
3	*Pseudonodosinella*	*elongata*											x			x												
4	*Bathysiphon*	*eocenica*	x		x									x				x						x				
5		*saidi*												x								x		x				
6		*taurinensis*							x																			
7		*usamai*																										x
8	*Rhabdammina*	*abyssorum*	x							x		x		x				x										
9		*linearis*	x													x			x									
10	*Orbulinelloides*	*agglutinatus*																										x
11		*arabicus*																						x				
12		*kaminskii*																										x
13		*sztrakosae*								x																		
14		*testacea*	x				x																					
15	*Ammodiscus*	*cretaceous*		x	x		x			x		x	x			x	x	x	x	x	x	x		x		x	x	
16		*incertus*								x		x																
17		*latus*											x						x									
18	*Glomospira*	*gordialis*	x						x									x	x		x	x		x				
19	*Miliammina*	*kenawyi*																				x		x				
20	*Reophax*	*globosus*		x												x												
21	*Asanospira*	*franciana*								x																		
22	*Haplophragmoides*	*walteri*					x						x			x			x					x				
23	*Lituotuba*	*lituiformis*	x													x												
24	*Paratrochammino.*	*spainica*							x																			
25	*Reticulophragmiu.*	*amplectens*							x				x															
26	*Ammobaculites*	*agglutinans*								x					x													
27		*cubensis*			x																	x		x				
28		*originalis*														x												
29	*Recurvoides*	*anormis*														x												
30	*Popovia*	*beckmanni*														x												
31	*Pavonitina*	*biarritzensis*								x					x													
32	*Spiroplectinella*	*carinata*							x	x		x		x														
33		*dalmatina*													x			x										
34		*nuttalli*				x																x		x				

Table 1: The distribution of the Bartonian-Priabonian benthic foraminiferal species in Some Tethyan Localities. 1:US (USA), MX (Mexico), CR (Caribbean), VZ (Venezuela), AO (Atlantic Ocean), EG (England), SN (Spain), FN (France), BG (Belgium), GM (Germany), PD (Poland), HG (Hungaria), V (Slovenia), RN (Romania), BG (Bulgaria), IT (Italy), AG (Angola), TZ (Tanzania), ET (Egypt), IR (Iraq), UA (United Arab Emirates), PN (Pakistan), JN (Japan), NZ (New Zealand), PO (Pacific Ocean).

35		*pectinata*							x	x							x										
36	*Vulvulina*	*advena*	x						x	x				x			x										
37		*haeringensis*					x		x	x							x						x				
38		*jarvisi*	x		x	x	x					x		x													
39		*spinosa*	x						x																		
40	*Plectina*	*emiratensis*																					x				
41		*eocenica*	x											x			x										
42	*Gaudryina*	*ennakhali*	x				x																x				
43		*osmani*	x				x																x				
44	*Verneuilina*	*hungariana*												x									x				
45	*Tritaxia*	*alpina*	x														x						x				
46		*kruhelensis*							x	x		x															
47		*longa*	x							x		x					x					x					
48	*Arenobulimina*	*kaminskii*					x																				
49	*Dorothia*	*eocenica*	x							x																	
50		*fallax*							x			x															
51		*nacataensis*		x													x						x				
52		*textilaroides*	x							x				x													
53	*Marssonella*	*hafitensis*																					x				
54	*Karreriella*	*bradyi*	x						x																		
55		*halkyardi*	x												x												
56		*subglabra*								x		x															
57	*Martinottiella*	*cimermani*													x												
58	*Textularia*	*agglutinans*								x												x					
59		*communis*								x												x		x			
60		*crookshanki*								x				x								x					
61		*deperdita*								x				x													
62		*fahmyi*																				x					
63		*karimae*												x													
64		*plummerae*	x										x				x						x				
65	*Clavulinoides*	*elongata*								x				x										x			
66	*Pseudogaudryina*	*textilaroides*										x			x												
67	*Pseudoclavulina*	*trinitatensis*	x						x																		
68	*Clavulina*	*sztrákosae*								x																	
69	*Cylindroclavulina*	*colomi*										x		x	x												
70		*rudislosta*								x		x			x												
71		*spainica*							x																		
72	*Tritaxilina*	*pupa*	x						x	x				x			x					x					
73		*ozsvárti*												x													

5. PALEOENVIRONMENT

Arenaceous foraminifera tend to increase in cooler environment, which means that increase in shallow-water environments or in upper bathyal environment or more deeper (Murray, 1973). The tubular taxa (e.g. *Bathysiphon*) are rare in neritic settings but common in bathyal facies, while elongated serial taxa (e.g. *Gaudryina, Siphogaudryina, Dorothia*, *Pseudoclavulina, Clavulina*) are most common in the upper to middle bathyal assemblages (Nagy et al., 2000). The Textulariid benthic foraminiferal distributions are closely tied to the organic carbon flux of the sea floor and organic carbon content of the sediment and the dissolved oxygen content of bottom water and pore water oxygenation, and the benthic foraminiferal distribution is limited by a combination of food availability and oxygenation, and the oxygen content of bottom waters is not a limiting factor, the amount of organic flux to the sea floor mainly governs the occurrence of benthic species in the sediments (Mohan et al., 2001). Bejaoui et al., considered some agglutinated genera (such as *Gaudryina*) are typical bathyal to upper abyssal assemblage with high terrigenous sedimentation rate and associated moderate organic flux (Bejaoui et al., 2019). Anan in 2021 noted that the Indo-Pacific Ocean and Mediterranean Sea exhibit pronounced similarities, which indicate that the connection between the two areas mentioned by a marine seaway, and the East Atlantic fauna was much more closely related to the fauna than it is today.

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