

Original article

Rectogerochammina eugubina nov. gen., nov. sp., a new agglutinated foraminifer from the Upper Cretaceous of Gubbio, Italy

Rectogerochammina eugubina nov. gen., nov. sp., un nouveau genre et une nouvelle espèce de foraminifère agglutiné du Crétacé supérieur de Gubbio, Italie

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Abstract

We describe the new agglutinated foraminiferal genus and species *Rectogerochammina eugubina* nov. gen., nov. sp. from the Upper Cretaceous Scaglia Rossa Formation of the Umbria-Marche Basin in Italy. The genus differs from *Gerochammina* (Neagu, 1990) in the presence of a terminal uniserial part.

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Keywords: Foraminifera; New genus; Cretaceous; Scaglia Rossa; Italy

Résumé

Nous décrivons ici les nouveaux genre et espèce du foraminifère agglutiné *Rectogerochammina eugubina* nov. gen., nov. sp. provenant des niveaux du Crétacé supérieur de la Formation Scaglia Rossa du bassin d'Ombrie-Marche en Italie. Ce genre diffère de *Gerochammina* (Neagu, 1990) par la présence d'une partie terminale unisériée.

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Mots clés : Foraminifère ; Nouveau genre ; Crétacé ; Scaglia Rossa ; Italie

1. Introduction

The genus *Gerochammina* is a cosmopolitan deep-sea benthic foraminifer that is common in Upper Cretaceous sediments. Although the genus name *Gerochammina* was not established until 1990 (Neagu, 1990), some of the species attributed to the genus have been known since the time of Grzybowski (1896). Species attributed to the genus have been variously placed in *Gaudryina*, *Karrerella*, *Karrerulina*, or *Plectina* by 20-century authors. Some of the representatives of this group display distinct stratigraphic ranges, raising the possibility that this group may be useful for stratigraphic correlation in deep-sea sediments.

As part of a larger biostratigraphical study of the Upper Cretaceous agglutinated foraminifera (Cetean, 2009), we col-

lected new samples from Italy and Romania to investigate the biostratigraphy of deep-water agglutinated foraminifera (DAAF) and their potential for correlation. In the course of this work, we have encountered a previously undescribed prolixoplectid foraminiferal species that we believe belongs in the *Gerochammina* group. Unlike the previously described species of *Gerochammina*, the chamber arrangement of the new species from Contessa is terminally uniserial. In this study we describe this new agglutinated foraminifer, which we designate as the type species of the new genus *Rectogerochammina* nov. gen. Kaminski, Cetean and Neagu,

2. Material and methods

We collected a set of evenly-spaced samples from the Turonian to Maastrichtian of the Contessa Highway Section, near Gubbio Italy (lat. 43° 22' 47" N; long. 13° 33' 49" E).

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All samples consist of indurated limestones belonging to the Scaglia Bianca and Scaglia Rossa Formations. The limestone samples (100 g) were slowly dissolved in dilute HCl to release the agglutinated foraminifers, and washed over a 63 μm sieve. Foraminifera were picked from the acid residues and mounted onto cardboard reference slides. Specimens were drawn in camera lucida or photographed on a JEOL JSM-6480LY SEM at University College London. Type specimens were deposited in the collections of the Department of Paleontology, Natural History Museum (London) and Grzybowski Foundation, located in the Geological Museum of the Jagiellonian University (Kraków).

3. Systematics

Suborder VERNEULININA Mikhalevich and Kaminski, 2004

Superfamily VERNEULINACEA Cushman, 1911

Family PROLIXOPLECTIDAE Loeblich and Tappan, 1985

Rectogerochammina nov. gen. Kaminski Cetean and Neagu

Type species: *Rectogerochammina eugubina* nov. sp. Kaminski, Cetean and Neagu (monotypic).

Description: Test free, elongated, tapered at both ends, with parallel sides. Coiling initially high trochospiral, reducing to biserial, and finally uniserial. Wall agglutinated, non calcareous and imperforate, silicified. Aperture terminal, a round opening.

Remarks: Differs from *Gerochammina* Neagu, 1990 in the presence of a terminal uniserial part. *Karrerulina* possesses a terminal aperture, but its coiling never reduces to uniserial.

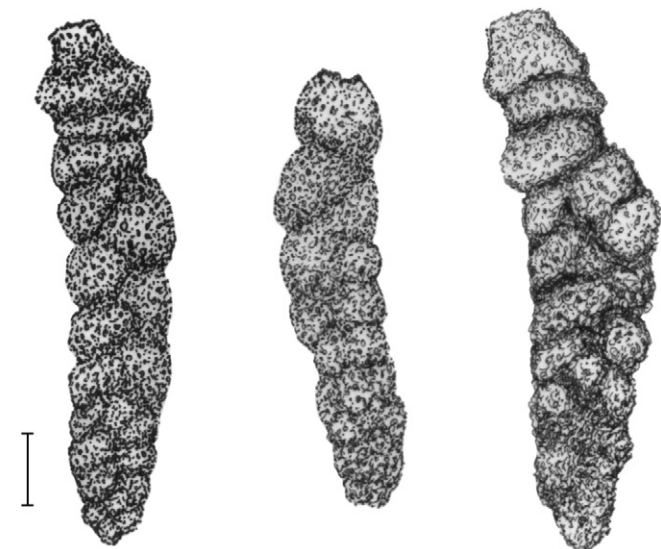


Fig. 1. Type specimens of *Rectogerochammina eugubina* nov. gen., nov. sp., Campanian, Scaglia Rossa Formation, Contessa Highway Section, near Gubbio, Italy. Specimen on left is the holotype, Scale bar = 100 μm . Other specimens are paratypes.

Spécimens types de Rectogerochammina eugubina nov. gen., nov. sp., Campanien, Formation de Scaglia Rossa, Coupe de l'autoroute à Contessa, à proximité de Gubbio, Italie. Le spécimen de gauche est l'holotype. Échelle = 100 μm . Les autres spécimens sont les paratypes.

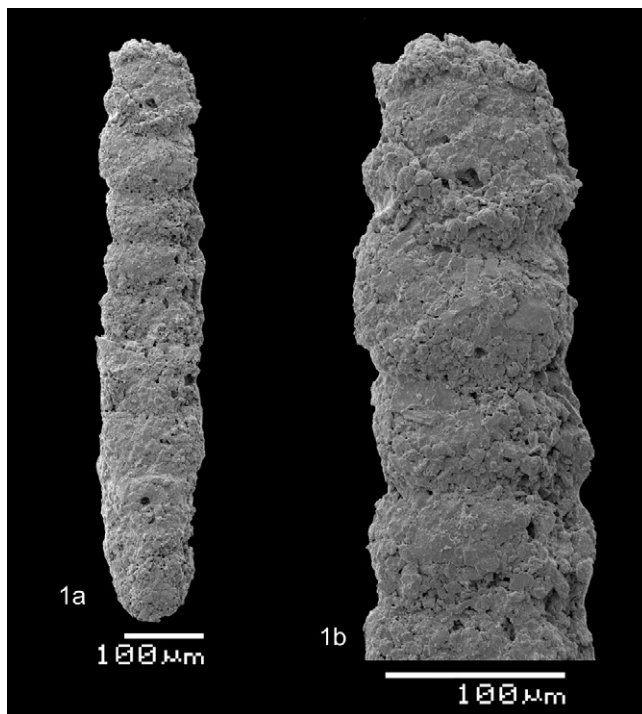


Fig. 2. Paratype of *Rectogerochammina eugubina* nov. gen., nov. sp., Campanian, Scaglia Rossa Formation, Contessa Highway Section, near Gubbio, Italy, lateral view (SEM) with details of the uniserial portion.

Paratype de Rectogerochammina eugubina nov. gen., nov. sp., Campanien, Formation de Scaglia Rossa, Coupe de l'autoroute à Contessa, à proximité de Gubbio, Italie, vue latérale (MEB) avec les détails de la portion unisériée.

***Rectogerochammina eugubina* nov. sp.** Kaminski, Cetean and Neagu Figs. 1 and 2

Spiroplectinata (?) sp. 1. Kuhnt, 1990: p. 325, pl. 6, fig. 8.

Description: Test cylindrical with parallel sides, with the early stage bluntly rounded, coiling initially high trochospiral with 5–6 whorls, with number of chambers per whorl decreasing towards the biserial stage, which consists of about 4 pairs of chambers, followed by a terminal uniserial stage of 3 or 4 chambers. Wall finely agglutinated, imperforate, with a large quantity of siliceous cement, transparent in immersion, with simple chamber interiors. Aperture circular, terminal.

Remarks: Differs from *Gerochammina* in the presence of a terminal uniserial part. Specimens are fragile, and broken specimens can easily be confused with the terminally biserial species *Gerochammina stanislawi* Neagu, 1990 or *Gerochammina lenis* (Grzybowski, 1896). In the Contessa Section of Italy, both *Gerochammina lenis* and *Rectogerochammina eugubina* nov. gen., nov. sp. were found to co-occur in strata of Campanian age, though the total stratigraphic range of the former species is longer, ranging from lower Campanian to upper Maastrichtian or lower Paleocene (Neagu, 1990).

Derivation of name: From the Roman name of the city of Gubbio.

Type Locality: Contessa Highway section of the Umbria-Marche Basin, near Gubbio, Italy.

Type Level: Campanian, Calcareous nannofossil biozones CC19–22 (Kaminski et al., in press), Scaglia Rossa Forma-



Fig. 3. Specimen of *Gerochammina* sp. from the upper Santonian of Izlaz Valley, Eastern Carpathians showing a loosely biserial to lax-uniserial terminal chamber arrangement. Scale bar = 100 μ m.
Spécimen de Gerochammina sp. du Santonien supérieur de Izlaz Valley, Carpathes orientales montrant un arrangement bisérié à lâchement-unisérié (loges alternées dans un arrangement intermédiaire entre unisérié et bisérié) le long de sa loge terminale. Échelle = 100 μ m.

tion, 170 m above the top of the Cenomanian/Turonian boundary black shale horizon.

Type Specimens: The holotype (PF 68306) and one paratype (PF 68307) have been deposited in the Palaeontology Department of the Natural History Museum, London.

Dimensions: Length of holotype = 0.72 mm; length of multi-serial part = 0.25 mm; maximum width = 0.15 mm; height of last chamber = 0.10 mm.

Material: > 20 specimens from Italy and Romania.

Occurrence: In the Contessa Highway Section of Italy, specimens were recovered from the Lower Campanian to the lowermost upper Campanian in an interval dated as Zones (CC19–22) based on calcareous nannofossils (Kaminski et al., in press). However, the first occurrence may actually be lower (and last occurrence higher) in the stratigraphic record because specimens are often broken owing to the delicate nature of the test. Kuhnt (1990) illustrated the species as *Spiroplectinata*(?) sp. 1 from the Lower Campanian of Contessa. A single specimen of *Gerochammina* sp. with a long biserial part and tendency to become uniserial was recovered by Cetean (2009) from the uppermost Santonian of the Plaiu Formation, Dâmbovita Valley, Eastern Carpathians (Fig. 3). Grzybowski (1896) may have observed the species in his study of the Campanian red clays from Wadowice, Poland. In our opinion, the specimen Grzybowski illustrated as *Bigenerina fallax* Rzehak is likely a terminally uniserial specimen of *Rectogerochammina*. In Grzybowski’s collection from Wadowice, housed in the Geological Museum of the Jagiellonian University, one slide is preserved labelled “*Bigenerina fallax* Rzehak” (UJ-115P-51) containing four specimens of *Gerochammina* spp. One of these specimens possesses a single lax-uniserial terminal chamber, though not the specimen illustrated by Liszka and Liszkowa (1981) in their revision of Grzybowski’s collection.

Rectogerochammina eugubina is associated with Scaglia-type agglutinated foraminiferal assemblages dominated by tubular astrorhizids with subordinate numbers of hormosinids and organically-cemented lituolids. This is typical DWAF association found in pelagic deep-water carbonates indicating a normal marine lower bathyal setting, with low organic flux.

AGE	EPOCH	STAGE	GEO-MAGNETIC POLARITY	PLANKTONIC FORAMINIFERA ZONES	<i>Rectogerochammina eugubina</i> , n.sp., n.g.	Gerochammina occurrences													
						Contessa Highway		Eastern Carpathians Neagu, 1992		Eastern Carpathians									
						<i>G. stanislawi</i>	<i>G. lenis</i>	<i>G. obesa</i>	<i>G. stanislawi</i>	<i>G. lenis</i>	<i>G. obesa</i>	<i>G. lenis</i>	<i>G. obesa</i>						
70	LATE CRETACEOUS	Maastrichtian	C30	A. mayaroensis															
			C31	R. fructifera															
			C32	G. gansseri															
75		Campanian		G. aegyptiaca															
				G. havanensis															
				R. calcarata															
80			C33	G. ventricosa															
				G. elevata															
85		Santonian		D. asymetrica															
		Coniacian		D. concavata															
90		Turonian	C34	M. schneegeansi															
				H. helvetica															
				W. archaocretacea															
95		Cenomanian		R. cushmani															
				R. reicheli															
				R. globotruncanoides															

Fig. 4. Stratigraphical occurrence of *Gerochammina*-group taxa in the Upper Cretaceous of the Umbria-Marche Basin, Italy and in the Eastern Carpathians, Romania. Right-hand column represents our new observations from the Gura Beliei Formation of the Eastern Carpathians.
Répartition stratigraphique des taxa du groupe Gerochammina dans les niveaux du Crétacé supérieur du bassin d’Ombrie-Marches, Italie et des Carpathes orientales, Roumanie. La colonne de droite représente nos nouvelles observations de la Formation de Gura Beliei dans les Carpathes orientales.

4. Discussion

The genus *Gerochammina* originated in the late Albian with the appearance of *G. stanislawi*, a species that possesses a large trochospiral part with a long, slightly twisted terminal biserial part (Neagu, 1990). According to Neagu (1990), the species ranges into the Turonian, but we recorded the species in the Coniacian in the Contessa section in Italy. The evolutionary trend from *G. stanislawi* to *Rectogerochammina* appears to take place by the appearance of a transitional form that we observed in the Santonian of the Eastern Carpathians (Fig. 3). This unnamed transitional form displays a chamber arrangement that can be described as loosely biserial to “lax-uniserial” (*sensu* Neagu and Neagu, 1995) in the terminal part of the test. This evolutionary trend from biserial to uniserial chamber arrangement culminates in the appearance of a terminal uniserial part in *Rectogerochammina*. The chamber arrangement in the terminal part of the test is truly uniserial, with horizontal sutures between chambers, rather than loosely biserial or lax-uniserial. Our new genus *Rectogerochammina* is not the only Late Cretaceous agglutinated foraminiferal genus that displays this evolutionary tendency toward chamber reduction with ontogeny. The Lower Campanian to Maastrichtian genus *Rectoprotomarssonella* Kaminski et al., 2008 displays a similar trend, with a well-developed terminal uniserial part. The stratigraphic ranges of *Gerochammina* and *Rectogerochammina* nov. gen. in the Contessa Highway Section of Italy and in the Eastern Carpathians is presented in Fig. 4.

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