

## THE SYSTEMATIC POSITION OF THE FORAMINIFERAL GENUS *CUBANINA* PALMER, 1936 AND ITS RELATIONSHIP TO *COLOMINELLA* POPESCU, 1998

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**Abstract.** We examined topotype specimens of *Cubanina* preserved in the P.J. Bermúdez collection in INTEVEP, in Los Teques, Venezuela. Our observations of abraded and broken specimens reveal a regularly canaliculate wall structure, with pseudopores clearly visible as a regular pattern of small dark spots on the abraded test surface, owing to their pyrite infillings. We therefore transfer the genus *Cubanina* Palmer, 1936 to the order Textulariida, subfamily Colominellinae Popescu, 1998.

The genus *Colominella* POPESCU, 1998 (type species *Textulariella paalzowi* CUSHMAN, 1936, described from Costei in Transylvania) is similar to *Cubanina* in the fact that it possesses an identical coiling mode and internal vertical partitions, but differs in possessing a long biserial stage and lacking a terminal uniserial stage. Our finding of pseudopores in *Cubanina* means that the two genera are likely to be closely related. In agglutinated foraminifera, the transition from a biserial stage to a uniserial stage is regarded to be a more advanced character state within a lineage. Terminally uniserial genera generally have a biserial ancestor. The fact that *Cubanina* is reported from an older stratigraphical level than *Colominella* or the other genus in the subfamily (the terminally biserial genus *Colomita* GONZALEZ-DONOSO, 1968) presents an interesting evolutionary paradox that begs further investigation.

**Keywords:** Foraminifera, systematics, wall structure, Oligocene, Cuba

### INTRODUCTION

The foraminiferal genus *Cubanina* PALMER, 1936 (type species *Cubanina alavensis* PALMER, 1936), first described from the Oligocene of Cuba, is characterised by its triserial to uniserial coiling and thick, coarsely agglutinated wall. The chambers are subdivided by vertical partitions that extend from the floor to the ceiling of the chambers. However, the original description of Palmer (1936) does not mention the nature of the agglutinated wall, and the original illustrations do not reveal any additional details (Fig. 1). Loeblich & Tappan (1964) studied type specimens of *Cubanina alavensis* housed in the UNSM in Washington, and designated a lectotype, but did not add remarks on the wall structure. Loeblich & Tappan (1987) placed the genus within the superfamily Ataxophragmiacea, which is characterised by its solid agglutinated wall.

Specimens of *Cubanina* housed in the Bermúdez Collection at INTEVEP in Los Teques, Venezuela were collected from "Batey of Central Alava", Matanzas Province, Cuba. These specimens may even be metatypes or paratypes, because D.K. Palmer and P.J. Bermúdez collaborated on the study of the Cuban Oligocene. We examined these specimens as part of our work on the revision of the agglutinated foraminiferal genera. The purpose of this study was to investigate the nature of the agglutinated wall of *Cubanina*, and determine its systematic position within the current classification of the agglutinated foraminifera (Kaminski, 2004).

### MATERIAL & METHODS

We examined topotype specimens of *Cubanina alavensis* preserved in the P.J. Bermúdez collection in INTEVEP, Los Teques, Venezuela. A total of 102 specimens from seven localities are housed in nine slides

in the P.J. Bermúdez Micropaleontological Reference Center in Cabinet 1, tray 11. Specimens were photographed using a Zeiss SV12 binocular microscope with an attached digital camera.

### SYSTEMATIC PALEONTOLOGY

Suborder TEXTULARIINA DELAGE & HEROUARD, 1896

Superfamily EGGERELLACEA CUSHMAN, 1937

Family EGGERELLIDAE CUSHMAN, 1937

Subfamily COLOMINELLINAE POPESCU, 1998

**Emended Diagnosis.** Test free, early stage trochospiral or triserial, later biserial or uniserial; wall agglutinated, canaliculated, interior of chambers subdivided by vertical, sometimes horizontal plates; aperture an arch at the base of the apertural face, becoming terminal in uniserial forms.

**Remarks.** The subfamily Colominellinae now contains four genera: *Colominella* Popescu, 1998, *Colomita* Gonzalez-Donoso, 1968, *Cubanina* Palmer, 1936, and *Matanzia* Palmer, 1936.

*Cubanina* PALMER, 1936, emended herein  
Plate I, figures 1-8

**Synonyms.** *Cubanina* PALMER, 1936, p. 123.

**Type species.** *Cubanina alavensis* PALMER, 1936; OD.

**Emended Description.** Test large, elongate, up to 4.5 mm in length, circular in section, early stage triserial, later uniserial, interior of chambers partially subdivided by narrow vertical partitions that project inward from the outer wall and extend from the chamber floor to the roof. Wall agglutinated, thick, canaliculate, medium to coarsely agglutinated. Aperture an oval areal opening in

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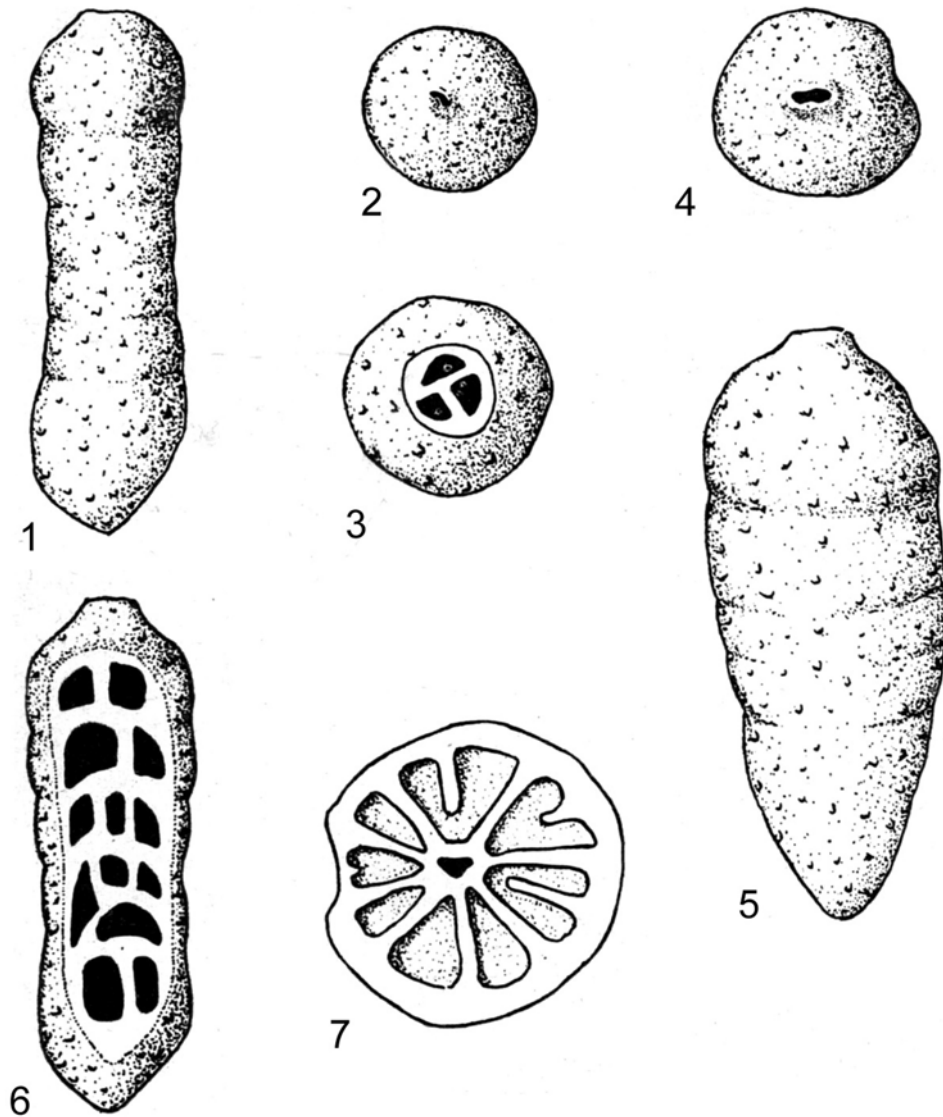


Fig. 1 - *Cubanina alavensis* Palmer from the Lower Oligocene of Matanzas Province, Cuba. Co-types. 1. Lateral view of megalospheric specimen, x25, 2. Top view, x30, 3. Sectioned initial portion of megalospheric section showing chamber arrangement, x43, 4-5. Top and lateral views of microspheric specimen, x28, 6. Tangential vertical section showing internal partitions, x36, 7. Transverse section through uniserial portion showing internal partitions, x37 (from Palmer, 1936).

the triserial portion, later terminal and rounded, produced on a stout collar made of coarse agglutinated grains. Eocene–Oligocene; Cuba.

**Remarks.** Paratype specimens of *Cubanina alavensis* in the Bermúdez collection in INTEVEP were sent to P.J. Bermúdez by Dorothy Palmer, with whom he collaborated. These are housed in cabinet 1, in slide BC297. Topotype specimens of *Cubanina alavensis* in the Bermúdez collection are from “Batey of Central Alava”, Matanzas Province, Cuba, and housed in slide BC836. Additional specimen slides in the Bermúdez collection are from the Eocene of Camaguey Province and from Pinar del Rio Province, Cuba. Broken specimens clearly show the vertical internal partitions. Specimens have a medium to coarsely agglutinated wall, comprised of siliceous and calcareous particles that include the occasional small foraminiferous tests. The terminal apertures are round and may appear radiate because of the positioning of larger

agglutinated grains within the rim of the aperture. Abraded topotypes reveal a regularly canaliculate wall structure, with pseudopores clearly visible owing to their pyrite infillings (see plate 1, fig. 3). Because the wall is clearly canaliculate, we therefore transfer the genus to the suborder Textulariina, subfamily Colominellinae (in the classification of Kaminski, 2004).

#### DISCUSSION

The Miocene genus *Colominella* POPESCU, 1998 similarly possesses vertical internal partitions, but differs in possessing a long biserial stage and in lacking a terminal uniserial stage. *Matanzia* additionally differs in possessing an early trochospirally coiled stage. Our finding of pseudopores in *Cubanina* means that the two genera are likely to be closely related. In agglutinated foraminifera, the transition from a biserial stage to a

uniserial stage is regarded to be a more advanced character state within a given lineage. Terminally uniserial agglutinated genera generally have a biserial ancestor. The fact that *Cubanina* is found at an older stratigraphical level than *Colominella* or the other genus in the subfamily (the terminally biserial genus *Colomita* GONZALEZ-DONOSO, 1968) presents an interesting evolutionary paradox that begs further investigation. Either *Colominella* possesses a long ghost range as shown in Figure 2, or the type locality of *Cubanina* is in fact from a younger stratigraphic horizon

than originally reported. According to Dr. Silvia Bustamente (Centro de Investigaciones de Petroleos, Cuba), some of the type localities that D.K. Palmer & P.J. Bermúdez listed as Oligocene are in fact of Miocene age. If this is the case, then the evolution of a uniserial taxon from a biserial ancestral form is a greater possibility, and our understanding of the true evolutionary relationships of genera in the subfamily Colominellinae awaits the revision of Palmer's type localities.

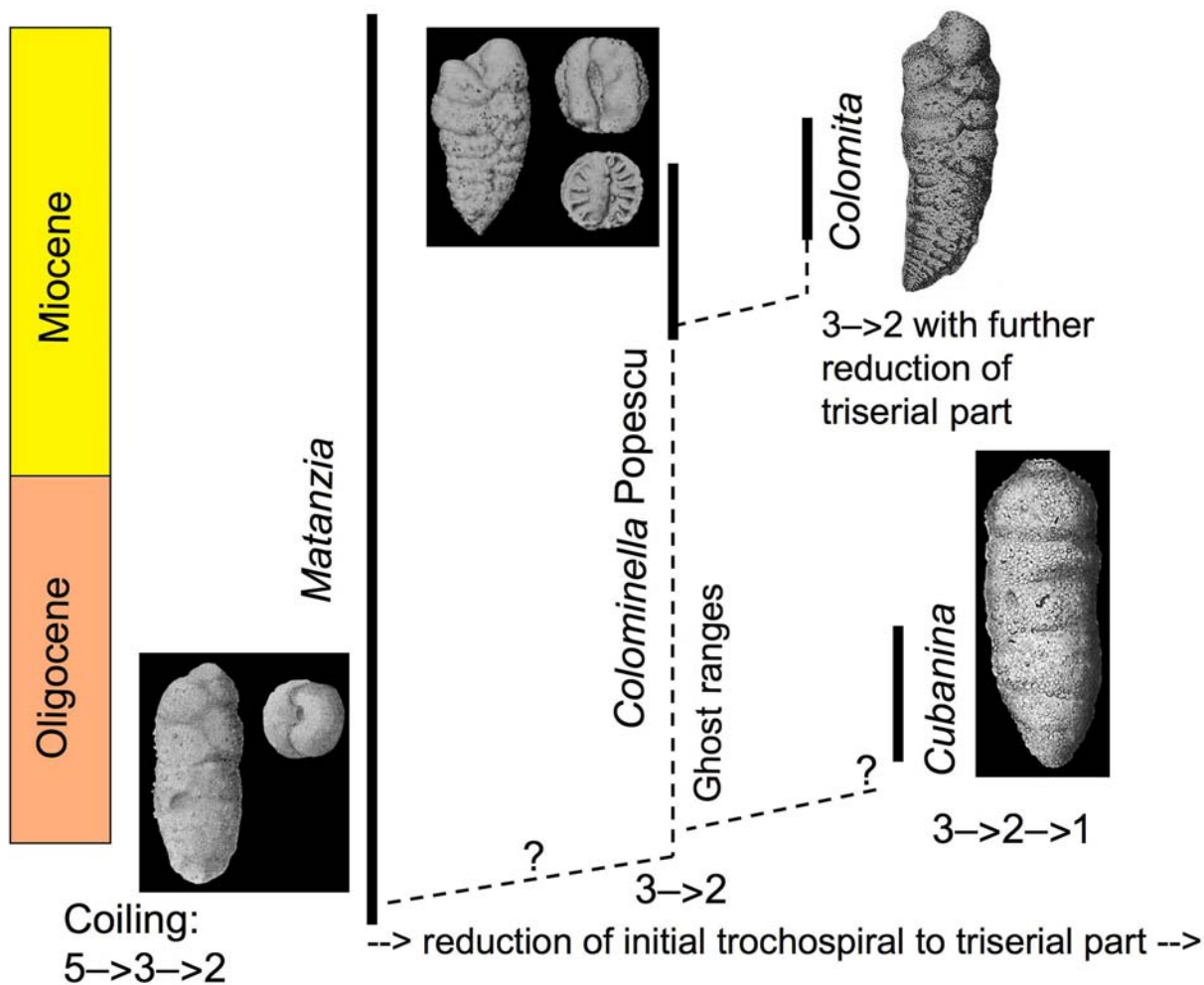


Fig. 2 - Proposed evolutionary relationships of the genera in the subfamily Colominellinae POPESCU, 1998. We propose that evolution within subfamily progresses through reduction of the numbers of chambers in the initial coiled portion from 5 to 3 by and reduction of its size relative to the biserial or uniserial parts.

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## PLATE EXPLANATION

Figs. 1,2, 5-8 -Paratypes, Oligocene, Matanzas Province, Batey of Central Alava, Cuba; Colon water well, 375 feet; D.K. Palmer sta. 1551 (BC 297). 1-2. Microsphaeric specimens in lateral view; 5. Apertural view of broken microsphaeric specimen, 6. Broken microsphaeric specimens showing internal vertical partitions; 7, 8. Broken megalosphaeric specimens showing internal partitions.

Fig. 3 - Middle Oligocene, Matanzas Province, Batey of Central Alava, Cuba, Bermúdez sta. 416 (BC 835). Abraded megalosphaeric specimen showing pyrite-infilled pores.

Fig. 4 - Middle Oligocene, Matanzas Province, Batey of Central Alava, Cuba, Bermúdez sta. 416. Creole Oil type collection. Juvenile megalosphaeric specimen showing oval areal aperture.

All scale bars = 100 microns

## PLATE I

