

MEMOIRS

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JAN BACCAERT

First record of
Nummulites involutus Schaub
in the Early Eocene of Belgium:
a taxonomic-ecological approach

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FIRST RECORD OF *NUMMULITES INVOLUTUS* SCHAUB IN THE EARLY EOCENE OF BELGIUM: A TAXONOMIC-ECOLOGICAL APPROACH

by Jan BACCAERT¹

¹ Department of Geology and Soil Science, Ghent University, Belgium
JanM.Baccaert@UGent.be

Abstract

The present paper deals with the nummulites from the Ronse (Waaienberge) outcrop (an ancient railway section formerly exposing the Sands of Mons-en-Pévèle), yielding a nummulite fauna representing the earliest nummulite immigration into the Belgian Basin during the Lower Eocene. The nummulites concerned are identified herein as a monospecific population of *Nummulites involutus* Schaub. The relationship *N. involutus*-*N. planulatus* (Lamarck) is discussed. An ecological model (based upon inferred multiple observations on recent Nummulitidae) is developed explaining the morphological variability in this *involutus*-population, which exhibits the lowest taxonomic diversity possible, a single species.

Trimorphism has been observed in the *involutus*-material from Ronse (Waaienberge). The relationship between several morphological parameters has been demonstrated in the three generations of *N. involutus* and it has been made clear that the test growth and the chamber volume accretion apparently follow the same general rule as described in recent *Operculina ammonoides*. Variation in any of these parameters has a bearing upon test flattening, test solidity (calcification) and evolute-involuteness of the test. These parameter variations moreover have been shown to be active also in the *seasonal* variation pattern.

As we find test morphologies homologous with those observed in modern symbiont bearing foraminiferal tests, we dispose of a supplementary tool for ecological interpretation: thicker, solidly built gamonts reflect conditions of shallower water and higher energy (r-strategy) whereas flatter, longer-lived schizonts and agamonts reflect K-strategies in deeper water and/or more shaded environments. An attempt has been made to visualise and interpret the variation in relative proportions of gamonts, schizonts and agamonts.

Keywords: Ypresian, Belgian Basin, Foraminifera, nummulites, ecology, morphological variability

Dedication

I dedicate this contribution to the memory of Lukas Hottinger (former Professor of Paleontology at the University of Basel, Switzerland, deceased in 2011), without whose stimulating insights this article could never have been written.

1. Introduction

1.1. General remarks

Nummulites are the only group of larger foraminifera with a K-mode strategy of life that immigrate into the Belgian Basin during the Eocene. This immigration took place during two periods in the Lower Eocene and during several periods in the Middle- and Upper Eocene. The area concerned represents a bight-like extension of the southernmost North Sea neighboring the Anglo-Parisian Basin in the South. These basins constitute a part of the eastern shores of the Atlantic Ocean and represent marginal basins in respect to the Pyrenean gulf further South and the Tethyan realms in

the Mediterranean towards the East during this period of Earth history.

The broader aim of the investigation, of which the present study constitutes the first part, was to start a review of the successive nummulite incursions in the Eocene of the Belgian Basin, as the question arose whether these incursions were congruent with reported climate oscillations during the Eocene. Since these nummulite populations had not been thoroughly studied or restudied over half a century or more, it could be expected that taxonomical adjustments would be necessary.

So far, the first temporary nummulitid immigrants into the Belgian Basin were invariably identified as

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The present paper deals with the nummulites from the Ronse (Waaierenberge) outcrop (an ancient railway section formerly exposing the Sands of Mons-en-Pévèle), yielding a nummulite fauna representing the earliest nummulite immigration into the Belgian Basin during the Lower Eocene. The nummulites concerned are identified herein as a monospecific population of *Nummulites involutus* Schaub. The relationship *N. involutus*-*N. planulatus* (Lamarck) is discussed. An ecological model (based upon inferred multiple observations on recent Nummulitidae) is developed explaining the morphological variability in this *involutus*-population, which exhibits the lowest taxonomic diversity possible, a single species.

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As we find test morphologies homologous with those observed in modern symbiont bearing foraminiferal tests, we dispose of a supplementary tool for ecological interpretation: thicker, solidly built gamonts reflect conditions of shallower water and higher energy (r-strategy) whereas flatter, longer-lived schizonts and agamonts reflect K-strategies in deeper water and/or more shaded environments. An attempt has been made to visualise and interpret the variation in relative proportions of gamonts, schizonts and agamonts.

The author: Dr Jan Baccaert is a retired scientist and free collaborator at Ghent University in the Department of Geology. He has gained expertises in Paleontology and Geology.