PRELIMINARY REPORT ON THE WALL OVERGROWTH IN SOME LOWER OLIGOCENE RETICULATE NUMMULITES (FORAMINIFERIDA), SW KUTCH, INDIA

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ABSTRACT

Carbonate accretion in the larger foraminifera Nummulites Lamarck proceeds with the individual laminae being laid down on the sediment-free test surface at the time of chamber addition. In a marked departure from this general pattern, a few microspheric specimens of reticulate Nummulites collected from the Lower Oligocene rocks of southwestern Kutch, India were found to exhibit overgrowth of the test wall upon other benthonic foraminifera (OBF). It seems that wall overgrowth may have constrained the OBF specimens that plausibly thrived on the reticulate Nummulites.

Keywords: Foraminifera, wall overgrowth, Oligocene, reticulate Nummulites, Kutch, India

INTRODUCTION

The shallow marine Lower Oligocene rocks of Kutch, India are excellent repository of reticulate Nummulites (Foraminiferida), see Adams (1986), Biswas (1992) and Sengupta et al. (2011a). Morphology and diversity of these reticulate Nummulites have been examined by Nuttall (1925), Mohan (1965), Dasgupta (1970), Roveda (1970), Sengupta (2000 and 2002), Sarangi et al. (2001), Shukla (2008) and Sengupta et al. (2011a and 2014). In this communication, we report the hitherto unaccounted nature of the test wall encountered in some Lower Oligocene microspheric specimens of reticulate Nummulites collected from southwestern Kutch. The examined specimens reveal overgrowth of the test wall upon other benthonic foraminifera (OBF).

MATERIALS AND METHOD

Materials for the present study were isolated from the yellowish brown glauconitic marl of the Lower Oligocene Basal Member, which constitutes the lowest unit of the Maniyara Fort Formation (Biswas, 1992), see Figs. 1A-B. The limestone (R22) and marl (R23-R25) samples were collected from the flanks of Rakhdi river near Khari (23° 28’ N, 68° 41’ E) in southwestern Kutch. The marl samples were crushed and boiled in water mixed with sodium carbonate to obtain matrix free foraminiferal tests as stated in Glaessner (1963). The marl samples yielded abundant specimens of reticulate Nummulites; the megalospheric tests were nearly 6 times more abundant than the microspheric ones. Thirty microspheric tests of reticulate Nummulites were recovered from the marl samples, of which 5 tests from the samples R 23 and R 25 revealed the overgrowth feature. These 5 specimens were externally examined under the stereomicroscope; one of the specimens was subsequently examined under the scanning electron microscope (SEM). Lack of adequate specimens for the preparation and examination of the oriented sections deterred the taxonomic exercise, and as such, the identity of the OBF specimens remains elusive at the present stage of the investigation.

OBSERVATION

The OBF specimens are small in size (D 2.0 – 3.5 mm)
overgrowth being an aberrant morphological development can be ruled out because overgrowth involves only the OBF in complete exclusion of the ambient detritus, viz. mineral grains and skeletal fragments. In fact, the exclusion of random detritus in the overgrowth feature possibly indicates that the overgrown OBF were live individuals rather than dead bioclasts. It seems likely that the live OBF individuals interacted with the live specimens of reticulate Nummulites before being overgrown by the latter. This live-live interaction among foraminifera may have been in the form of stubborn attachment of the OBF on to the surface of the reticulate Nummulites (Walker et al., 2011). The basis of such attachment may have been pseudopodial anchorage, bioadhesion or both. High tensile strength and elastic properties of the pseudopodial network in Astrapommina rara and Amphisorus hemprichii provide good analogue for the strong pseudopodial anchorage (Bowser et al., 1992 and Travis et al., 1988), while Langer’s (1992 and 1993) observation that Rosalina globularis secretes an organic glue for the temporary fixation of the tests provides a close analogue for the bioadhesion.

Nigam et al. (1993) and Mazumdar et al. (2012) reported barnacle growth on the dead Holocen foraminifera from the west coast of India. Sengupta and Nielsen (2009), Sengupta et al. (2011b) and Syed et al. (2015) reported activities of algae, worms, bivalves, corals and bryozoans upon the bioclasts of Middle Eocene Nummulites, while Sengupta (1999) reported bioerosion of acrothoracican cirriped (crustacean) in the dead tests of Oligocene reticulate Nummulites from Kutch. Evidence favoring the live-live interaction among the benthonic biota involving foraminifera is rather rare (Syed et al., 2014 and Skinner, 2014). So far, Mukhopadhyay’s (2003 and 2007) account of sexual reproduction (plastogyany) among paired Middle Eocene Nummulites from the Cambay Basin constitutes the only Indian record of the live-live interaction among Nummulites. The present account appears to be a case of embedment (sensu Tapanila and Ekdale, 2007) of the live OBF by the reticulate Nummulites. Strategic embedment at and around the growing end may have stalled the growth and development of the OBF specimens. In the present study, only a few microospheric individuals of reticulate Nummulites were found to exhibit the overgrowth feature. Further investigations are necessary to understand the prevalence of the overgrowth phenomenon in the larger foraminifera in general and Nummulites in particular.

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REFERENCES


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