SIGNIFICANCE OF BENTHIC FORAMINIFERAL PREDATION IN SPECIES DIVERSITY

V. SHARMA and RAVINDRA KUMAR
Department of Geology, University of Delhi, Delhi 110 007, India

PREDATION is a common feature in benthic organisms. Soft-bodied organisms are particularly vulnerable to predation. Organisms with exoskeleton have also been found to be victims of predation. Microorganisms with skeleton, such as foraminifera, have not much been reported to show the effect of such activities.

During the study of benthic foraminifera of Late Miocene to Early Pliocene rock sequence of Neill Island, Andaman Sea (figure 1), the authors found evidence of large scale predation. The sequence, which consists mainly of calcareous mudstone, is exposed on the east coast of the island. Thirty-eight samples from a 320 m thick sequence yielded a rich benthic foraminiferal fauna. The paraecological and biofacies study of benthic foraminifera as well as a number of other evidences suggest a change in depth

Figure 2. *Robulus nicobarensis* (1) and *Uvigerina gemmaeformis*, (2) showing holes made by the predators. Scale (bar) represents 200 μ.

during the deposition of the upper half of the sequence. While the lower half of the studied sequence was deposited in the upper part of the lower bathyal zone (depth zones after Ingle[1]) at about 2500 m, the upper half received sediments at 3000–3500 m depth.

An examination of about 300 individuals of benthic foraminifera from each sample showed the

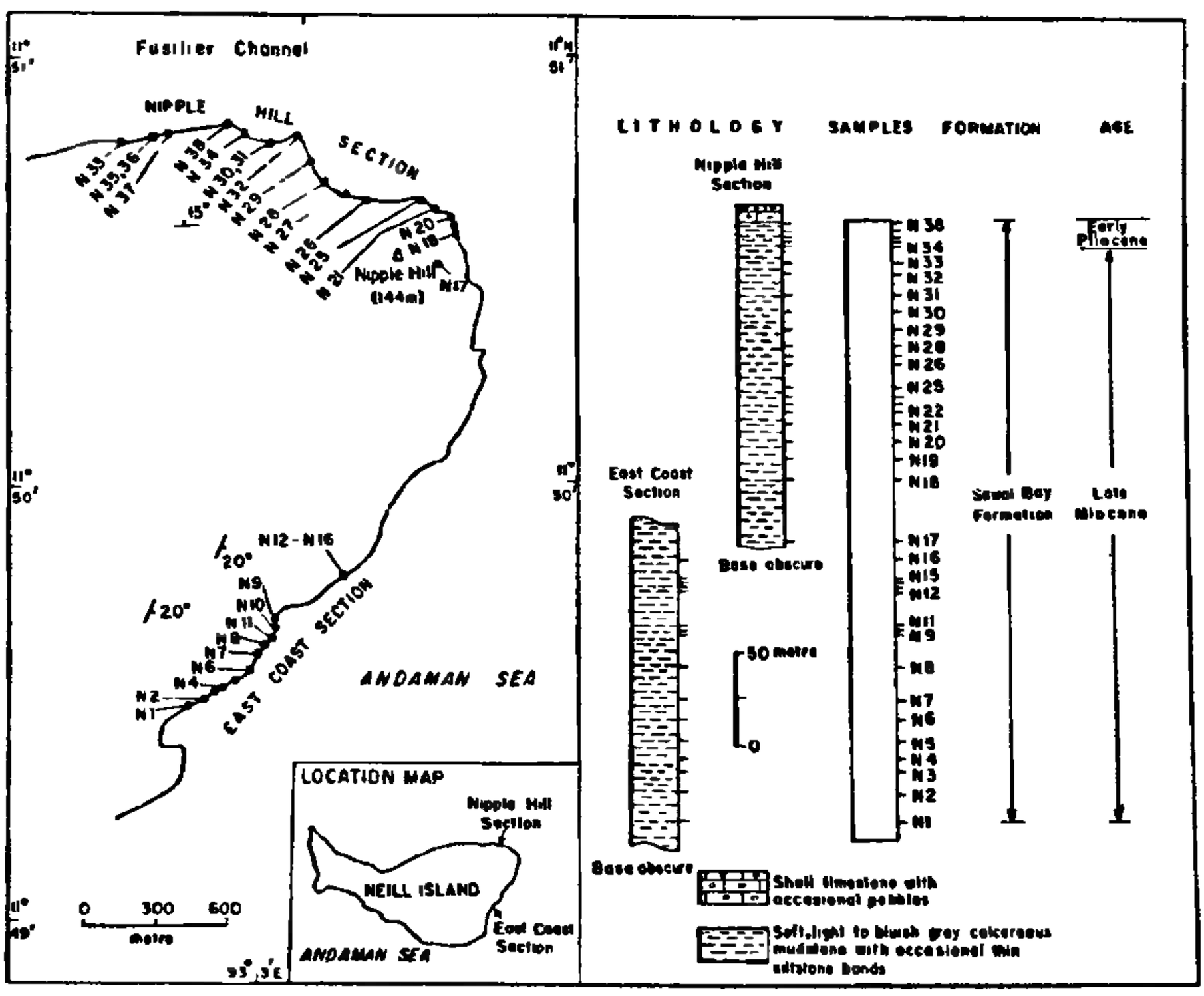

Figure 1. Sampling locality, stratigraphic position of samples and lithology of the studied sections.

Figure 3. Plot of species diversity, $H(S)$, in each sample.

effect of predation. Predation was more prevalent in species with larger chambers. Predators have, in all cases, bored round holes in the chamber wall (figure 2). The holes range from 0.01 to 0.08 mm in diameter. Majority of the holes are of 0.03 mm in diameter. The most commonly affected species are *Gyroidinoides nitidula* Schwager, *Uvigerina gemmaeformis* Schwager, *Neouvigerina proboscidea* (Schwager), *Cibicides bengalensis* Srinivasan and Sharma, *Pleurostomella* cf. *brevis* Schwager, *Robulus nicobarensis* (Schwager) and *Hoegludina elegans* (d'Orbigny).

Variation in dimensions of holes is suggestive of a number of different types of predators. Some mollusks and nematode worms are known to make holes in the chamber walls of foraminifera to feed on their protoplasm[2]. Since the protoplasm is dispersed in all the chambers[3,4], the predators possibly made a number of holes on the tests to feed on the protoplasm.

Predation plays an important role in shaping the community structure, particularly in influencing the species diversity[5–8]. In the studied material, a plot of benthic foraminiferal species diversity calculated by Shannon-Wiener Information Function,

$$H(S) = -\sum_{i=1}^{s} P_i \ln P_i,$$

in each sample is shown in figure 3. The diversity values show a decrease towards the younger part of the sequence. Change in diversity is caused by various factors. In the deep sea, diversity pattern is influenced by environmental stability[9,10], competition, predation and supply of nutrients[8,11]. The authors carried out a detailed study on the species diversity of the same fauna. The evidences suggest that though factors like environmental stability and nutrient supply play a major role, predation too removed certain species giving rise to low diversity, particularly in the later part of the deposition of the sequence.

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DEVELOPMENT OF THE SALT GLAND IN *ACANTHUS ILLICIFOLIUS* L.

YASH DAVE, VINOTH THOMAS and P. M. KURIACHEN

Department of Biosciences, Sardar Patel University, Vallabh Vidyanagar 388 120, India.

PLANTS growing in saline habitats have various physiological means of preventing a determinate level of salt accumulation in their tissues[1]. Salt glands play a vital role for the regulation of mineral content in plants. The glands found on the leaf blades seem to act as salt-secreting hydathodes.