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 foraminifer, 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 Neil 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 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 Ingle1) 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 2. Robulus nicobaren sis (1) and Uvigerina gemmaeformis, (2) showing holes made by the predators. Scale (bar) represents 200 μ.

Figure 1. Sampling locality, stratigraphic position of samples and lithology of the studied sections.
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 gemmaformis* Schwager, *Neouvigerina proboscidea* (Schwager), *Cibicides bengalensis* Srinivasan and Sharma, *Pleurostomella cf. brevis* Schwager, *Robulus nicobarensis* (Schwager) and *Hoeglundina 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 protoplasm2. Since the protoplasm is dispersed in all the chambers3,4, 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 diversity5-8. 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 stability9,10, competition, predation and supply of nutrients8,11. 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.

The authors thank Prof. M. S. Srinivasan, Department of Geology, Banaras Hindu University, Varnasi for providing samples and stratigraphic data.

3 November 1986; Revised 2 March 1987


---

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

**YASH DAVE, VINOTH THOMAS and P. M. KURIACHEN**

Department of Biosciences, Sardar Patel University, Vallabhbhidyanagar 388 120, India.

Plants growing in saline habitats have various physiological means of preventing a determinate level of salt accumulation in their tissues1. 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.