

## A NOTE ON THE *PAVONINA FLABELLIFORMIS* D'ORBIGNY (BENTHIC FORAMINIFERA) FROM THE ARABIAN SEA

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### ABSTRACT

The detailed study of the inner shelf surface sediments off Karwar (India) revealed the occurrence of a benthic foraminiferal species *Pavonina flabelliformis* d'Orbigny. This is the first report of this species in the Arabian Sea. The ecological set up of *Pavonina flabelliformis* in modern sediments off Karwar suggests and updates the lower depth limit to 33 metre as against reported from deeper regions in previous studies. This will have significant bearing in paleodepth studies of sedimentary strata having fossils of this species.

### INTRODUCTION

As a part of the research programme on the recent foraminifera from the inner shelf off Karwar (central west coast of India), surface sediment samples were collected from the water depth ranging from 22 to 52 m, using Peterson grab sampler on board *DSV Nand Rachit*. While making a distribution analysis of the foraminifera in these samples (Nigam, 1993) the author came across few specimens of benthic foraminifera *Pavonina flabelliformis* d'Orbigny having well preserved and complete test. This species has not been reported so far from the Arabian Sea. The present short note reports this species first time from this region (Arabian Sea). Certain observations made on this species are given below.

### SYSTEMATIC TAXONOMY

**Order** : FORAMINIFERIDA Eichwald,  
1830

**Sub order** : ROTALIINA, Delage and

Herouard, 1896

**Super family** : BULIMINACEA, Jones, 1875

**Family** : PAVONINIDAE Eimer and  
Fickert, 1899

**Genus** : *PAVONINA* d'Orbigny, 1826

*Pavonina flabelliformis* d'Orbigny

Figures 1 a-b

*Pavonina flabelliformis* D'ORBIGNY, 1826, p. 260, figs. 10-11., BARKER, 1960, p. 92, pl. 45, figs. 17, 19-21.

*Pavonina flabelliformis* forma *typica* BOLTOVSKOY, 1961, p. 292, pl. 5, fig. 31.

**SHAPE** : Test broadly palmate, flattened with reduced triserial stage of only earlier few chambers then biserial with rapidly broadening chambers and finally uniserial with very broad, low, semicircular and strongly curved, proximally at the margins.

38 KHARE

**CHAMBERS** : 12 to 13 in number

**COLOUR** : White with grayish tint.

**DIMENSIONS (IN MM)** : Length 0.70, width 0.8, thickness 0.07.

**REMARKS AND PREVIOUS RECORDS** : This species has been reported from Atlantic Ocean, Pacific Ocean and North America (Loeblich and Tappan, 1987). Barker (1960) reported this species from Pacific Ocean and Madagascar whereas, Boltovskoy (1961) illustrated a similar species as *Pavonina flabelliformis* d'Orbigny forma *typica*. This specimen differs from the illustration of Boltovskoy in having more broader test and high curvature of the margin. It also differs from *Pavonina flabelliformis* forma *atlantica* reported by him as the later has more narrow test.

Later, Srinivasan and Rajshekhar (1980) recorded *P. flabelliformis* d'Orbigny from south coast cliff section of Outram Island, Ritchie's Archipelago (Andaman Sea) from Taipian stage of Nicobar series, belonging to late Pliocene age. Lithologically this section was soft brownish yellow calcareous silt mudstone and had very good preservation of foraminifera. However, it is interesting to note that the benthic foraminiferal assemblage suggested deposition of Taipian sediments in lower bathyal depth.

### ECOLOGY

**SUBSTRATUM** : The sedimentological parameters of this area are summarized from earlier published reports (Hashimi *et al.*, 1978; Nair *et al.*, 1978). Sediments are generally olive grey in colour, clayey silt in nature with the mean size of particles 6-8. The amount of  $\text{CaCO}_3$  is low (< 30%) in the inner shelf clayey silt off Karwar.

**HYDROGRAPHY** : The hydrographical data is obtained from Naik and Neelakantan (1989). The variations of these hydrographical parameters in and around the study area have been discussed below.

**SALINITY** : It shows a wide range of variations from 6.89 to 36.42‰

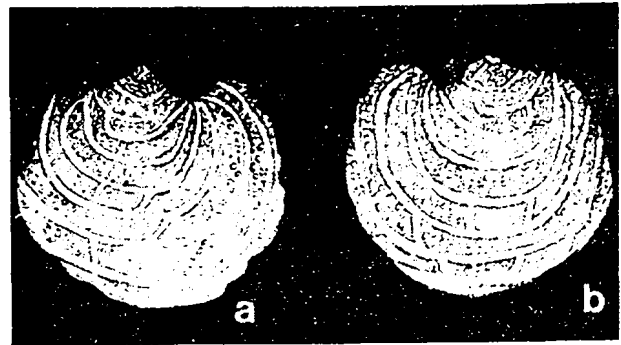


Fig. 1a One side view of *Pavonina flabelliformis* d'Orbigny (X50)

Fig. 1b Another side view of *Pavonina flabelliformis* d'Orbigny (X50)

**TEMPERATURE** : Oscillation in temperature at the surface waters were of the order of  $4^{\circ}\text{C}$  and ranging in general from  $26.6$  to  $30.9^{\circ}\text{C}$ .

**DISSOLVED OXYGEN** : The fluctuations in the concentration of dissolved oxygen in this area is between  $4.23$  and  $5.01$  ml/L.

**pH** : The overall hydrogen ion concentration (pH) varied from  $7.72$  to  $8.41$ .

**SUSPENDED LOAD** : The variation in the average suspended load was found between  $0.0419$  gm/L and  $3.2649$  gm/L.

In view of the foregoing, the noteworthy points of the present study are :

1. It is first report of the occurrence of this species from Arabian Sea.
2. This species is reported from much shallower depth (at 33 metre) than earlier reported depth level from other regions.
3. From Indian region (both Bay of Bengal and Arabian Sea) so far this species is reported in fossil form (from Taipian stage) whereas, it is recorded here from the recent sediments.
4. The present ecological conditions suitable for the existence of this species at such shallower depth may also have its significance in paleodepth studies of sedimentary strata having fossilized *P. flabelliformis*.

The material is housed in the micropaleontological repository of the National Institute of Oceanography numbered as GOD NIO Cat. No. K-120.

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#### REFERENCES

- BARKER, R.W.  
1960 *Taxonomic notes on the species figured by H.B. Brady in his report on the foraminifera dredged by H.M.S. 'Challenger' during the year 1873-1876.* Soc. Eco. Pal. Min., Spec. Publ., no. 9, 238 pp.
- BOLTOVSKOY, E  
1961 *Foraminiferos de la plata forma continental entre et Cabo Santo tome Y La desembocadura del Rio de la plata.* Revista del Museo Argentino de ciencias naturales, Bernardino Rivada via Instituto Nacional De investigacion de las ciencias naturales. Buenos Aires Imprenta Y casa Editora, 684, Calle Peru 684.
- D'ORBIGNY, A.  
1826 *Tableau methodique de la classes des Cephalopodes.* Ann. Aci. Nat., Paris, Ser. 1, vol. 7, pp. 245, pls. 10-17.
- HASHIMI, N.H., KIDWAI, R.M. and NAIR, R.R.  
1978 *Grain size and coarse fraction study of sediments between Vengurla and Mangalore on the western continental shelf of India.* Indian Jour. Mar. Sci., vol. 7, pp. 231-238.
- LOEBLICH, A.R. Jr. and TAPPAN, H.  
1987 *Foraminiferal genera and their classification.* Von Nostrand Reinhold, New York, 970 pp.
- NAIK, U.G. and NEELAKANTAN, B.  
1989 *Seasonal abundance of phytoplankton in the inshore waters of Karwar.* Comp. Physiol. Ecol., vol. 14, pp. 219-226.
- NAIR, R.R., HASHIMI, N.H., KIDWAI, R.M., GUPTHA, M.V.S., PAROPKARI, A.L., AMBRE, N.V., MURALINATH, A.S., MAS-CARENHAS, A. and D'COSTA, G.P.  
1978 *Topography and sediments of the western continental shelf of India - Vengurla to Mangalore.* Indian Jour. Mar. Sci., vol. 7, pp. 224-230.
- NIGAM, R.  
1993 *Foraminifera and changing pattern of monsoon rainfall.* Curr. Sci. Bangalore, vol. 64, pp 935-937.
- SRINIVASAN, M.S. and RAJESHEKHAR, C.  
1980 *Stratigraphy and Micro fauna of Outram island, Ritchie's Archipelago, Andaman Sea.* Proc. 111rd Indian Geol. Cong., Poona, pp 295-307.