Occurrence of Pycnodonte (Phygraea) in the Navania Limestone, Wadhwan Formation, Saurashtra and its ecological significance

R. M. BADVE

Abstract

Present communication reports the occurrence of Pycnodonte (Phygraea) navaniaensis sp, nov. from the Navania Limestone of the Wadhwan Formation. Presence of the genus Pycnodonte along with Hemiaster is indicative of subhaline waters and low energy conditions at the time of deposition of the Navania Limestone.

Introduction

The Navania Limestone, a middle member of the Wadhwan Formation, Saurashtra, Gujarat State, is an argillaceous limestone weathering into white marly material which has yielded a few oyster specimens belonging to Phygraea Vyalov and Hemiaster. Small outcrops of this limestone, around the village Navania (2 km NE of Sidar 22°36' : 71°28'30") have a thickness of 1 m to 2 m without much lateral extent (Chiplonkar and Borkar, 1971 and 1973).

Systematic description

Family: Gryphaeidae Vyalov, 1936
Subfamily: Pycnodonteinae Stezal, 1959
Genus: Pycnodonte Fischer De Waldheim, 1835
Subgenus: Phygraea Vyalov, 1936
Pycnodonte (Phygraea) navaniaensis sp. nov.
Pl. I, Figs. 1-6

Material: Large number of specimens but most of them in fragmentary condition. Holotype No. MACS G 686.

Dimensions:

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Length</th>
<th>H/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>MACS G 686</td>
<td>20</td>
<td>16</td>
<td>1.3</td>
</tr>
<tr>
<td>MACS G 688</td>
<td>17</td>
<td>12</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Description: Shell suboval, prominent umbo well raised above hinge margin as is characteristic of Phygraea; hinge line short; dorso-posterior margin geniculate but slightly concave. Posterior margin straight or feebly convex; radial ornamentation totally absent, and both the valves very smooth; auricles absent; commissural shelf well defined.

Catachomata on the posterior side 7 to 8 in number; the ventral ones short, the dorsal ones long and vermiculate; anterior catachomata elongate, vermiculate and slightly more in number than those on the posterior margin; anachomata on the posterior margin 7-8 in number, long, vermiculate and branching; those on anterodorsal margin about 5-6 in number and short. The relict anachomata observable on RV.

Hinge triangular, resilifer slightly broader than the bourrelets. Adductor muscle mark dorsoposterior and typically orbiculart.

3*
The valves in general thin; shell structure vesicular as is characteristic of Pycnodonteinae.

Remarks: Nearest to the present species is Pycnodonte (Phygraea) vesiculosa (Sow.) a characteristic species of middle Cretaceous and widely reported from England, France, Belgium, Germany, Bohemia, Switzerland, Syria, South India and South Tibet (Coquand, 1869; Stoliczka, 1871; Pascoe, 1959). But the observable differences between these two species are that the present form has its shell thin, LV less capaceous, and shell less tall. Pycnodonte (Phygraea) proboscidea (d'Archiac) from Santonian of France, Germany, Bohemia, Algeria, etc. (Coquand 1868, p. 72-73, pl. 15, Fig. 10, pl. 16, Fig. 1-12, pl. 18, Fig. 1-5), is another comparable form which, however, shows distinctly biolobate and capaceous nature of the LV.

Ecological significance of Pycnodonte (Phygraea)

Presence of Phygraea in the Navania Limestone along with Hemiaster provides valuable information on the depositional conditions.

The genus Pycnodonte is a purely marine or of high salinity group, living from near surface levels down to depths of 1000 fathoms (Hopkins 1957, p. 1129).

Stenzel (1971, p. 1071) has laid special emphasis on the environment which is enjoyed by the gyph-shaped oysters. They thrived in euhaline salinity with low energy levels, and occur associated with other groups like ammonites, corals, echioids, etc. which also occur in euhaline conditions.

From the Navania Limestone, association of Pycnodonte and Hemiaster undoubtedly indicates euhaline conditions under which the deposition took place.

The gyph-shaped oysters are also known to favour low energy levels of the epicontinental seas (Stenzel 1971, p. 1071). The Navania Limestone, thus indicates the special environment of euhaline waters of low energy levels meaning that the sediments were deposited in fairly quiet waters. As already mentioned the extent of the Navania Limestone is not much. Hence, the above environment possibly prevailed over limited region where this limestone occurs.

Acknowledgements: The author is grateful to Prof. G. W. Chiplonkar, Head, Dept. of Geology and Palaeontology, for critically going through the manuscript and making useful suggestions. He is also thankful to Dr. G. B. Deodikar, Director, M.A.C.S, for providing necessary facilities.

References


— (1973) Stratigraphy of the area around Wadhwan, Saurashtra, Gujarat State. Recent Researches in Geology (A collection of Papers in honour of Prof. A. G. Jhingran, on his 65th Birthday). Hindusthan Publ. Corp. India, New Delhi, pp. 229-239.


Address of the author

R. M. BADE, Maharashtra Association for the Cultivation of Science, Pune 411 004.