

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

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## 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 euhaline 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, Gujrat 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 Sidsar 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: PYCNODONTINAE Stenzel, 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:

	Height mm	Length mm	H/L
MACS G 686	20	16	1.3
MACS G 688	17	12	1.4

**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 orbicular.

The valves in general thin; shell structure vesicular as is characteristic of Pycnodontinae.

*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 bioblate 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 gryph-shaped oysters. They thrived in euhaline salinity with low energy levels, and occur associated with other groups like ammonites, corals, echinoids, 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 gryph-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.

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