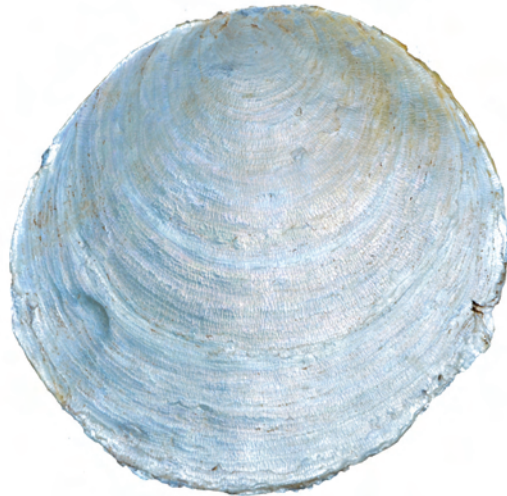


# *Placuna placenta* (Linnaeus, 1758)

Pralaya Ranjan Behera

## IDENTIFICATION

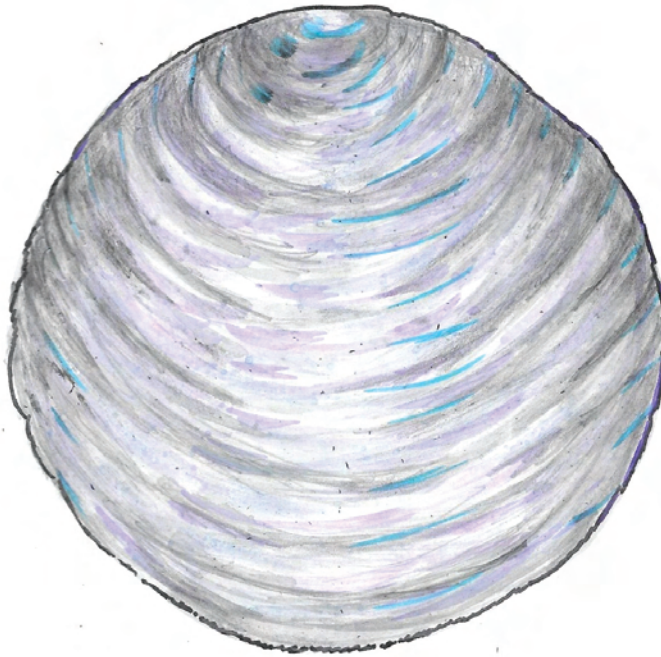
Order	: <b>Pectinida</b>
Family	: <b>Placunidae</b>
Common/FAO Name (English)	: <b>Windowpane oyster</b>



**Local names:** Kachga (**Marathi**); Talapugulla (**Telegu**)

## MORPHOLOGICAL DESCRIPTION

The shell of the adult windowpane oyster is almost circular in shape with length approximately equal to height. The shell is very compressed and the shell valves are also very flat, rounded and translucent. Inner surface of the valve is pearly. The adductor impression is at about centre. The umbo is small. Two thin ridge-like teeth diverge from the umbo making a characteristic inverted V shape angle. The shell has a size of 14 cm or even more and has many concentric growth lines. The shell is white in color.



## PROFILE

### GEOGRAPHICAL DISTRIBUTION

It is found in the Gulf of Aden, India, Malaya Peninsula, southern coasts of China and along the northern coasts of Borneo to the Philippines. In India, it is distributed in the Gulf of Kutch (Gujarat), Kakinada Bay (Andhra Pradesh), Nauxim bay (Zuari estuary in Goa) and Tuticorin bay (Tamil Nadu) and off Raigad district in Maharashtra.

### HABITAT AND BIOLOGY

*Racuna placenta* is found on muddy or sandy substrata from shallow waters to depths of 100 m. It is euryhaline. The internal organs confine themselves to the superior shell i.e. towards the right valve. It lies with the convex surface down on the seabed. It is dioecious. Occurrences of hermaphroditism, though reported in lengths between 110 to 139 mm at Kakinada bay, are very rare. Size at first maturity is 68 mm in length for both sexes. It spawns at the onset of north-east monsoon in October along the Okha coast in India. In the Philippines, it matures at a size of about 70 mm and has an extended reproductive cycle for 8-12 months and spawning occurs usually from February to May. It releases 24 million eggs in a single spawning and 250 million eggs during the entire spawning season. Egg diameter is 70  $\mu$ m.

## BREEDING IN CAPTIVE CONDITIONS

Researchers from the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD), Bangkok, Thailand have reported induced spawning of this species by water flow manipulation, UV irradiated seawater and photochemical methods. Sexually immature broodstocks collected from the wild were stocked and reared in tanks with mud substrate and were fed daily a mixture of *Isochrysis galbana* and *Tetraselmis tetrahele* at 2,00,000 cells/ml in 3:1 ratio for maturation. Sexually mature individuals spawned when exposed to UV light-irradiated seawater (925-1,395 mWh/l).

Broodstock development and induced spawning with thermal stimulation was carried out by researchers of Tuticorin R. C. of CMFRI, India in 2004. Broodstock collected from the wild were kept in aerated seawater tanks for 24 h. It was induced to spawn by thermal stimulation at 37 °C. Males started to spawn after 45 min, followed by females. Once spawning was over, the broodstock was removed and the eggs were allowed to fertilize. The eggs were yellow in color. The spawned eggs were spherical measuring 50 µm. Fertilization was immediate and the first polar body was released 15 min after fertilization.

## LARVAL REARING

Embryos developed to D-shaped veliger larvae of shell length (SL) 80-86 µm after 19-20 h. Percentage production of straight-hinged larvae from fertilized eggs varied from 51 % to 63 %. D-shaped veliger larvae (one day old) were reared in UV light-irradiated seawater until metamorphosis to plantigrade. Larvae were fed daily with monoalgal diet of *I. galbana*, *T. tetrahele* or *Chaetoceros calcitrans* at densities of 10,000-30,000 cells/ml. The D-shaped veliger became globular resulting in the disappearance of straight hinge line on day 3, measuring 110 µm SL. On day 4, the typical umbo stage (140 µm in SL) constituted about 90 % of the population. Late umbo stage was reached at 210 µm SL on day 5, pediveliger at 215 µm SL on day 7 and plantigrade at 235 µm SL on day 8. The spat grew to 340 µm SL on day 10. The average shell height on day 1 was 65.2 µm; 81.6 µm on day 3; 121.6 µm on day 6; 205.8 µm on day 9 and 300 µm on day 13. Average daily growth rate was 23.0 µm from day 1 to day 13. Larval settlement to spat was observed between 8 to 14 days. Shell length increment varied from 9.92 to 11.38 µm/day. The spat had neither byssus nor cement gland for attachment and hence were allowed to settle on tank surface. The spat was transferred to farm on day 80. Survival rate at metamorphosis was highest (12.60 %) when fed with *I. galbana* and lowest when fed with *T. tetrahele* (5.1 %). The best salinity for embryonic development and larval survival at metamorphosis ranged from 22 to 34 g/l and for larval growth from 16 to 34 g/l. The tolerance to lower and higher salinities progressively increased as the larvae developed from embryo to the plantigrade stage.

## NURSERY REARING

Information not available

## GROW-OUT

Information not available

## FOOD AND FEEDING

It is a filter feeder; feeding on phytoplankton, zooplankton and organic detritus. In captivity, the microalgae, *Isochrysis galbana* and *Tetraselmis tetrahele* are ideal food for immature broodstock.

## GROWTH RATE

In Philippines, growth of broodstock, in terms of increments in shell length and body weight was 15.0 mm and 12.6 g, respectively after 91 days of stocking. In India, the average growth in shell height of spat was 0.30 mm on day 13; 0.81 mm on day 22; 3.09 mm on day 36 and 12.44 mm on day 80 (average growth rate of 0.08 mm SL/day) during larval rearing. Growth rate of spat in farm was 0.59 mm/day.

## DISEASES AND CONTROL MEASURES

Infestation of gonad and digestive diverticula by a bucephalid parasite was observed at Kakinada Bay. At Mandapam, it was heavily infested by the pea crab, *Pinnotheres placunae*. Larval cestodes and trematodes parasitize it and lay encrusted in the mantle edge. Polychaetes in mantle cavity are common at Okha, Gujarat. *Polychaetes Polydora* and *Eunice indica* have been recorded on its surface.

## PRODUCTION, MARKET AND TRADE

### PRODUCTION

Information not available

### MARKET AND TRADE

In Philippines the translucent shell is used for the manufacture of lampshades and other shell craft items, which are exported to Europe, USA, Japan and West Germany. Philippine is the major producer of *P. placenta*, which ranks fifth in the fishery exports from the country. The export value

from Philippines was US \$ 36 million between 1986 and 1991. The meat is used in the preparation of bagoong, adobo, chowder and kapis omelet in the Philippines. In China, the shell is used in making medicinal preparations for diseases of eye and other ailments. In Ceylon, it is used in making a costly kind of slaked lime for applying on betel leaves used for chewing.

In India, initially the shells were used only in the lime industry at Kakinada, but later, there was good export of the flat right valve of the oyster. During 1968-1976; about 42 t of right valve alone were exported to Hong Kong and Japan by private traders from Kakinada. Subsequently it was also exported to Korea. From Tuticorin, the sundried shells are packed in polythene bas and transported to Bombay for sale. In Raigad district of Maharashtra, collection from the intertidal zone has started since 2013, in tune to the great demand that exists for shells from petroleum related industries, for capping and plugging the drilled holes after oil exploration surveys. Shells are also used in handicraft industry.

## CHALLENGES TO MARICULTURE

The breeding, seed production and larval rearing of the species has already been established and standardised. The culture of windowpane oyster needs to be upscaled in India. However, further adoption of its culture depends on creating awareness among fish farmers about its export potential.

## FUTURE PROSPECTS

Due to overexploitation for pearls and shells in considerable quantities every year, the resource is declining from wild at an alarming pace. Hence, it is protected under Schedule IV of the Indian Wildlife Protection Act, 1972. As captive seed production methods have been standardized, therefore, establishment of hatcheries for the replenishment of wild stock with hatchery produced spat will facilitate stock enhancement. Additionally it can be a foreign exchange earner if export channels are further developed to south-east Asian countries.

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