Tridacna maxima (Röding, 1798)

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IDENTIFICATION

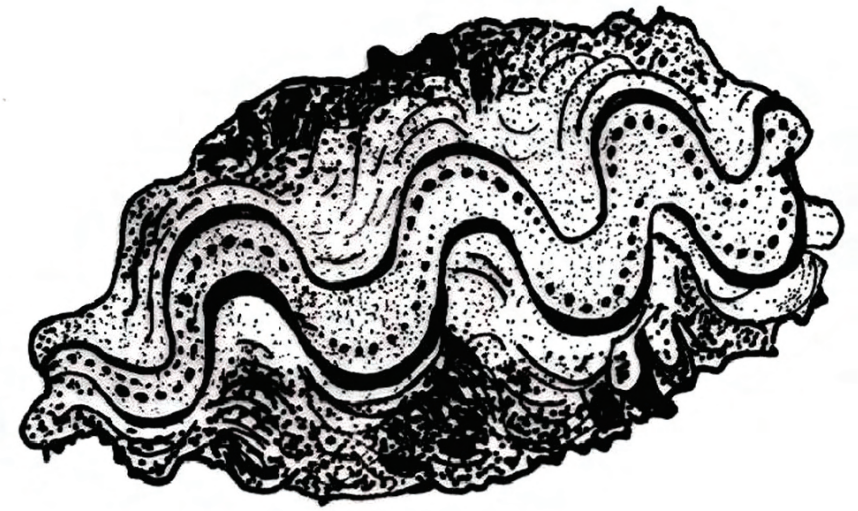
Order	:	**Cardiida**
Family	:	**Cardiidae**
Common/FAO Name (English)	:	**Small giant clam**

Local names: Not known

MORPHOLOGICAL DESCRIPTION

The shell is strongly asymmetrical in form, typically being much longer than tall. Shell typically has 5 distinct ribs. The ribs have numerous very tightly spaced but light scutes. However, these are typically eroded away by the burrowing activities in their natural habitat. It has numerous scutes present only on the upper portion of the shell. Upper margin is strongly curved and each valve is symmetrical to the other. Byssal opening is variable in size, being moderate to relatively large. Mantle extension is well past the margin, completely hiding the shell and the scutes. In-current siphon is ringed with numerous small, simple tentacles.

Source of image : RC of CMFRI, Tuticorin



It has a large shell that adheres to a rock by its byssus threads, which is a tuft of long and tough filaments protruding from a hole next to the hinge of the shell. The mantle side is bright blue, green or brown and is exposed and obscures the edges of the shell with its prominent and distinctively furrowed edges.

PROFILE

GEOGRAPHICAL DISTRIBUTION

It is widely distributed in the Indo-Pacific region from Egypt to Pitcairn Islands and Ogasawara, Japan to Lord Howe Island. In India, it is reported from west and east coasts, from Andaman and Nicobar Islands and Lakshadweep Islands.

HABITAT AND BIOLOGY

It is reef associated and inhabits depth ranges from 0-35 m. It is sessile attaching itself to rocks or dead corals. It does not need to filter-feed as much as other clams since it obtains most of the nutrients it requires from tiny photosynthetic algae known as zooxanthellae. At the juvenile stage it can acquire zooxanthellae and function symbiotically. It is a protandrous hermaphrodite. It reaches sexual maturity at a shell length of 4 cm at an age of two years. Reproduction is stimulated by the lunar cycle, the time of the day and the presence of other eggs and sperm in the water.

BREEDING IN CAPTIVE CONDITIONS

Induced spawning using macerated gonads was done at Anae Island, Guam. Adults were collected from the wild and kept in broodstock tanks. Ripe gonad was removed from sacrificed specimen and macerated in a blender using filtered sea water. On keeping the macerated gonads in sea water, clams starts releasing sperms within 2 to 3 minutes, which continued up to 6 hours, followed by release of eggs. Spawning was mostly observed from November to March. Approximate 2.08 - 2.9 millions eggs were released per spawning. Fertilized eggs measured 104.5 µm in diameter.

LARVAL REARING

After fertilization, typical bivalve spiral cleavage resulted in a spherical blastula. The rotating ciliated gastrulae were observed 7 hours after fertilization. Trochophore stage was reached 16 h post fertilization. Straight-hinge veliger stage was reached after 20 h of fertilization. Pediveligers developed by 9 days. Complete metamorphosis and final settlement was observed by day 12. The acquisition of zooxanthellae in the mantle of the juvenile occurred between 21-40 days. Smallest juvenile with zooxanthellae was 210 µm in shell length. In general, it acquired zooxanthellae immediately after metamorphosis. Juvenile shells with opaque patches were observed on day 47.

NURSERY REARING

Information not available

GROW-OUT

Information not available

FOOD AND FEEDING

It is a myxotroph filter feeder and photosynthesizes via its zooxanthellae. It derives its nutrition from uptake of dissolved matter through its epidermis and from its symbiotic relation with zooxanthellae, *Symbiodinium microadriaticum*.

GROWTH RATE

Growth rate of veliger shell was 2.7 µm/day. Shell growth rates after settlement and metamorphosis, until day 40 was 2.3 µm/day. After day 40, growth rate increased sharply (6.8 µm/day). This corresponded to a time when majority of juveniles acquired zooxanthellae. Juveniles attained a

shell length of 400-835 µm after 91 days of fertilization. It grew to a mean size of 78.4 mm shell length in 19 months.

DISEASES AND CONTROL MEASURES

Ranellid snails (gastropods) of the genus *Cymatium* are the most destructive predator for cultured giant clams. Only method for controlling is regular inspection and removal of visible snails. With regular weekly inspection, mortalities are limited to a minimum. In land-based systems, infestation is prevented by screening water through 25 µm filter bags or other forms of filters. Pyramidellid snails belonging to the genera *Turbonilla, Pyrgiscus* and *Tathrella* also damage this species. Mantle bleaching due to rapid fluctuations in environmental conditions, especially temperature and light, is responsible for expelling of its zooxanthella from all parts of mantle, leaving it white and without pattern. Gas bubble disease is caused in culture by high levels of dissolved gases.

PRODUCTION, MARKET AND TRADE

PRODUCTION

Information not available

MARKET AND TRADE

It is one of the main giant clam species traded globally. During 1994-2003, exports were recorded from 31 countries and territories (most notably from Australia, Fiji, the Federated States of Micronesia, French Polynesia, Kiribati, Madagascar, the Marshall Islands, Mozambique, New Caledonia, Papua New Guinea, Tonga, Vanuatu and Vietnam). It has good demand for the tourism based ornamental shell industry in Andaman and Nicobar Islands. The flesh is used as food in Andaman and Nicobar Islands. Valves are used as benitiers in churches.

CHALLENGES TO MARICULTURE

The breeding and seed production of the species has been reported from different countries; however it has not been reported from India. The main researchable issues, which have to be sorted out for this species in India, are (i) Life history study (ii) Healthy broodstock development protocol (iii) Larval rearing protocol: Standardization of larval rearing by environmental and nutritional manipulation.

FUTURE PROSPECTS

Due to overexploitation in considerable quantities every year for live ornamental trade, population is declining at a rapid pace. It is included in the Schedule I of Indian Wildlife (Protection) Act, 1972. It is protected under the IUCN red list, in which it is classified as Least Concern, Conservation Dependent. It is also protected under CITES Appendix II. The development of successful captive breeding and hatchery seed production practices will facilitate stock enhancement of the species. Hatchery reared seeds can be used to replenish wild stocks.

SUGGESTED READING

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