

Echinometra mathaei (Blainville, 1825)

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IDENTIFICATION

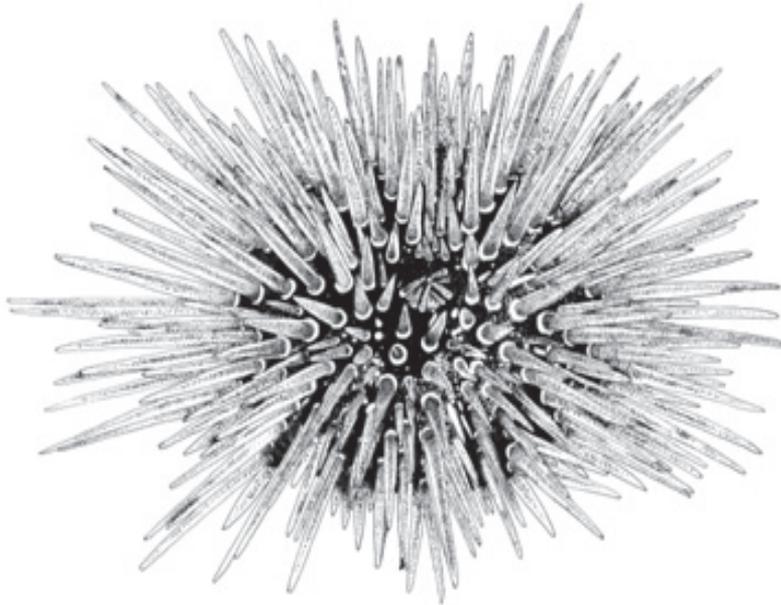
Order	: Camarodonta
Family	: Echinometridae
Common/FAO Name (English)	: Rock boring sea urchin



Local names: Samudra chokaro (**Gujarati**); Mahal (**Marathi**); Kadalacille (**Kannada**); Kadal chena (**Malayalam**); Kadalkutchi, Moorai, Muttankani, Kadal mulleli (**Tamil**); Samudra cinnavadu (**Telugu**)

MORPHOLOGICAL DESCRIPTION

The colour of the rock boring sea urchin is variable with the spines coloured purple or green with purple tips and the base coloured grey-green. It is characterized by a pale ring at the base of each spine. It shows commensalism with the shrimp *Athanas areteformi*.



PROFILE

GEOGRAPHICAL DISTRIBUTION

This sea urchin is distributed from Madagascar, the east Africa coast, Red Sea to Hawaii. It is tropical, found on reefs in the Indo-Pacific region. It occurs in Onotoa Atoll, Marshall Islands, Guam, Solomon Islands, Seleo Island, Netherlands, New Guinea, New Caledonia, south-east Arabia, Persian Gulf, India, Pakistan, Maldives, Ceylon, Australia, Philippine, China, south Japan, south Pacific and Hawaiian Islands. In India, it is found in Lakshadweep Islands, Tamil Nadu and Andaman and Nicobar Islands.

HABITAT AND BIOLOGY

Echinometra mathaei occurs along inter-tidal rocks, boring it in shallow waters. It prefers benthic areas and inshore waters. It grows to a diameter of about 5 cm. It feeds on algae and small invertebrates. It is gonochoristic. Gametes are released into the water and fertilization is external. Brooding is common, eggs are held either on the peristome, around the periproct or deep into the concavities on the petaloids. Embryos develop into planktotrophic larvae (echinopluteus) and live for several months in this state, before sinking to the bottom and adhere on the ground using their tube feet, where they metamorphose into young urchins.

BREEDING IN CAPTIVE CONDITIONS

The captive breeding of this species was carried out at Vizhinjam R. C. of CMFRI. Wild collected sea urchins were maintained in FRP tanks and fed with green algae and seaweeds *Ulva* sp. Adult sea urchins weighing 40 to 85 g were selected for induced spawning. After washing in 0.5 % Ampicillin for 10 min, it was injected with 1.5 to 2 ml of 0.5 M Potassium Chloride (KCl, pH 6.1) on its oral (mouth) side. It sheds its gametes after 40 to 60 sec of injection. After shedding of gametes, it was removed from the beakers. The beakers were gently rotated in clockwise and anti-clockwise direction for uniform mixing. The beaker was provided with mild aeration and kept at room temperature (28 to 32 °C) for fertilization.

LARVAL REARING

Around 18 to 20 hours post-fertilization, free-swimming prism stage larvae hatched out. The larvae were stocked in a 50 l aquarium tank at the rate of 5 nos./ml. The larvae metamorphosed into a 2-arm echinopluteus stage on the second day. They were fed with micro-algal feeds such as *Isochrysis galbana*, *Chaetoceros calcitrans* and *Nannochloropsis* sp. Water was exchanged at the rate of 50 % in two days. Larvae metamorphosed to 4-arm, 6-arm and 8-arm stages on the 3rd, 15th and 20th day post-fertilization. The larvae reached competency in 20 to 22 days.

NURSERY REARING

Information not available

GROW-OUT

Information not available

FOOD AND FEEDING

Information not available

GROWTH RATE

Information not available

DISEASES AND CONTROL MEASURES

It is host to a number of parasites viz., *Clavisodalis parvibullatus*, *Mecomerinx notabilis* and *Porcellidium echinophilum*.

PRODUCTION

Information not available

MARKET AND TRADE

The gonad of the sea urchin is a valuable sea food product in Asian and European markets. The gonads contain the carotenoid, echinenone, which is synthesised from β -carotene. Gonad colour depends upon the level of echinenone, which in turn influences the market value. Roe is consumed by local fishermen population along the Indian coast.

CHALLENGES TO MARICULTURE

Researchable issues include food and feeding, breeding and seed production. Type of feed influences the morphology, growth and duration of larval development. Research needs to be focused on improving the desirable gonad colour (bright yellow orange) through a combination of algal feed and prepared (formulated) diets. The quality of gametes and feeding during larval rearing are important in determining survival rate and is critical for obtaining large numbers of larvae.

FUTURE PROSPECTS

Decrease in global catch due to an increase in fishing effort and the great demand has generated keen interest for culture. Market value of the rock boring sea urchin is mainly based on color, texture, size, taste and quality of gonads. Improving broodstock with quality feed, larval rearing with suitable algae and grow out to marketable sizes will influence the market value in Asian and European markets. Successful seed production on a commercial scale coupled with steady demand as seafood product offers scope for its culture in India.

SUGGESTED READING

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