ISSN 0254-380 X

MARINE FISHERIES INFORMATION SERVICE

No. 169

July, August, September 2001

TECHNICAL AND EXTENSION SERIES

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN, INDIA

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)

In India, the Beche-demer-industry is mainly depending on *Holothuria scabra* (vella attai). A hatchery technology for the species has already been developed in 1988. In addition to this, another species *Holothuria spinifera* (chenna attai, or raja attai) is also being fished in large quantities and widely processed along the coast of Gulf of Mannar and Palk Bay. *H. spinifera* was once rated high in the market and are in good demand in China. Every year from India, Beche-de-mer worth more than one crore rupees is being exported to Singapore, which is the major market from where it is marketed to other countries.

At Tuticorin, freshly caught chenna attai were priced at rupees 10-15 per piece and the processed ones fetched Rs. 500-1000 per kg, depending on the count, which is next to vella attai in export market. The fishery of this species is throughout the year and is usually collected by trawlers, which forms the major part of sea cucumber fishery. In addition to this, it is coming as a by-catch in thallumadai, a local fishing gear and also by skin diving during the peak seasons (locally called chankuzhi). Sea cucumbers trawled, command lesser price, compared to those collected by skin diving, due to quality difference. Moreover, *H.spinifera* is very sensitive in nature, even a slight disturbance tends the animal to eviscerate, usually the gut, along with the right respiratory tubule and some times the gonad also. Therefore specimen collected by skin diving can be used as brood stock.

Considering their commercial value, attempts were initiated for hatchery production of seed of *H.spinifera*. About 8 numbers of *H.spinifera* (length ranging from 150-340 mm and weight ranging from 200-350 gm) were collected and brought to the laboratory during Feb. '2001 and maintained in a one tonne FRP tank with 10 cm thickness of coral sand at the bottom. For the first time, in the hatchery at TRC of CMFRI, Tuticorin, spawning could be achieved in *H.spinifera*, and the larvae were successfully reared up to the settlement stage.

On March 2nd 2001, after raising the anterior end with a little swaying movement, one of the male liberated sperms as white threads from the gonopore without any inducement. The animal was suddenly removed to clean filtered sea water and allowed to spawn further. An hour after the introduction of other brood stock into the sperm suspension, one of the female liberated eggs as a sudden spurt, similar to *H.scabra*. The eggs were spherical, visible to the naked eyes, varied from 166-190μm (Fig.1).

After fertilization, the eggs were carefully washed thoroughly to remove the excess sperms and maintained in a 100 l tank with filtered sea water. They were estimated at 13,000. First polar body was released after 40 minutes and cleavage started after 20 minutes. After three hours, blastula with a single blastopore have been developed. Motile gastrula with a ciliated and oval shaped body is observed after 24 hours and the size ranged in length from 265-282μm and diameter 166-199μm. The early auricularia was developed after 48 hours. It measured a length ranging from 448-564μm and pelagic in habit, similar to *H.scabra*, except the posterior loop, which was slightly broader than the anterior one. Feeding started from second day onwards, a mixture of three micro algae *Isochrysis galbana*, *Nanochlorosis* sp. and *Chaetoceros* sp. at a concentration of 20,000 cells/ml were fed initially, which was raised to 40,000 cells/ml in the later stages.

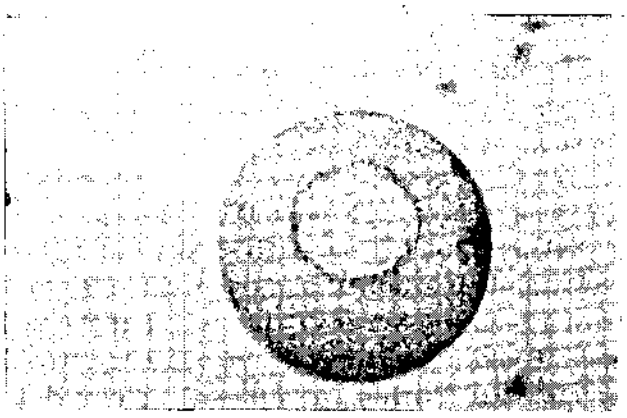

Fig. 1 Egg

On the ninth day, lateral projections in the auricularia became more prominent, the lipid speares appeared at the tip of the projections, which indicated the larval competency and its readiness to metamorphose if the conditions are suitable. At this later stage, the length of auricularia ranged between 796-964μm and breadth between 451-558μm (Fig.2). On the 10th day a few auricularia were metamorphosed to the non feeding, highly motile, barrel shaped doliolaria stage. At this stage, the length and the breadth varied from 365-515μm and 299-365μm respectively (Fig.3).

On the 13th day, a few doliolaria were transformed into the creeping stage called pentactula, and the composition of the larvae was observed to be auricularia (91%), doliolaria (7%) and pentactula (1%). The pentactula stage

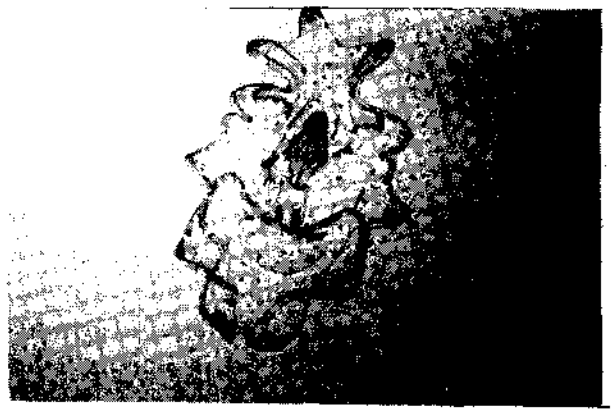

Fig. 2 Auricularia

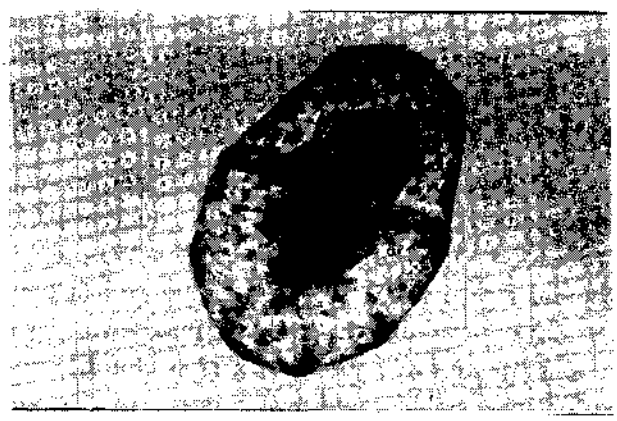

Fig. 3 Doliolaria

was tubular, with five tentacles at the anterior end and two tube feet at the posterior end (Fig.4). The colour was greenish brown and the size was much smaller than that of *H.scabra* and the length varied from 266-448μm and the breadth from 199-282μm. The experiment conducted to test the effectiveness of different settlement cues like powdered algae (Algamac), sargassum powder, spirulina powder, periphytic diatoms. By the 20th day, the tube feet and the tentacles became more distinct and the spicules could be seen projecting from the skin of three survived juveniles. Because of infestation of copepods and ciliates, further rearing couldn't be continued.

During the larval rearing, environmental parameters were regularly monitored. The water temperature ranged between 29-31^0 C, salinity 34-36 ppt, pH 8.01-8.2 and the dissolved oxygen varied from 2 - 4.15 ml/l. The water

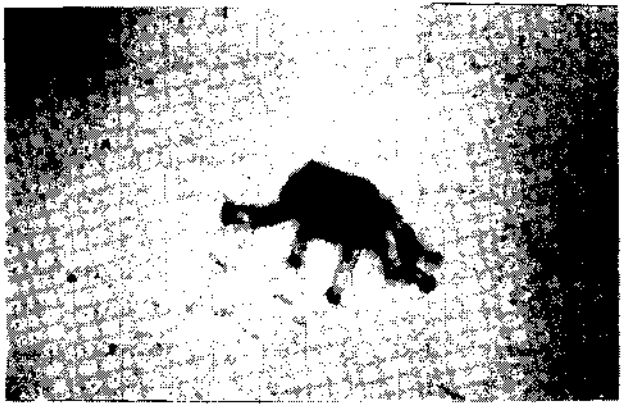

Fig . 4 Pentactula

was changed completely on alternate days and the larvae were taken out to find the survival rate. On other days, 50% water exchange was given by keeping the sieve inside the tank.

Preapared by: **P.S. Asha and J.X. Rodrigo, Tuticorin Research Centre of C.M.F.R. Institute, Tuticorin.**