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SUCCESSFUL INDUCED SPAWNING AND REARING OF THE HOLOTHURIAN *HOLOTHURIA (METRIATYLA) SCABRA* JAEGER AT TUTICORIN*

In India holothurians are exploited exclusively for export purpose. From holothurians a product commercially known as *beche-de-mer* is prepared. India at present is earning a foreign exchange equal to Rs. 20 lakhs per annum. Presently the markets in Hong Kong and Singapore offer US \$ 20 per kg of *beche-de-mer*. Although the price offered by the importers is very attractive and the process involved in the pre-

paration of the product is very simple and inexpensive, the major constraint for the development of the industry is the shortage of raw materials. On the mainland of India the holothurians are restricted to the Gulf of Mannar and Palk Bay region. At present two species of holothurians viz., *Holothuria (Metriatyla) scabra* and *Holothuria (Theelothuria) spinifera* are exploited commercially and there are evidences of over exploitation of these species. This situation forced the Government of India to impose a ban in 1982 on the export of the processed holothurians of less than 8 cm in size

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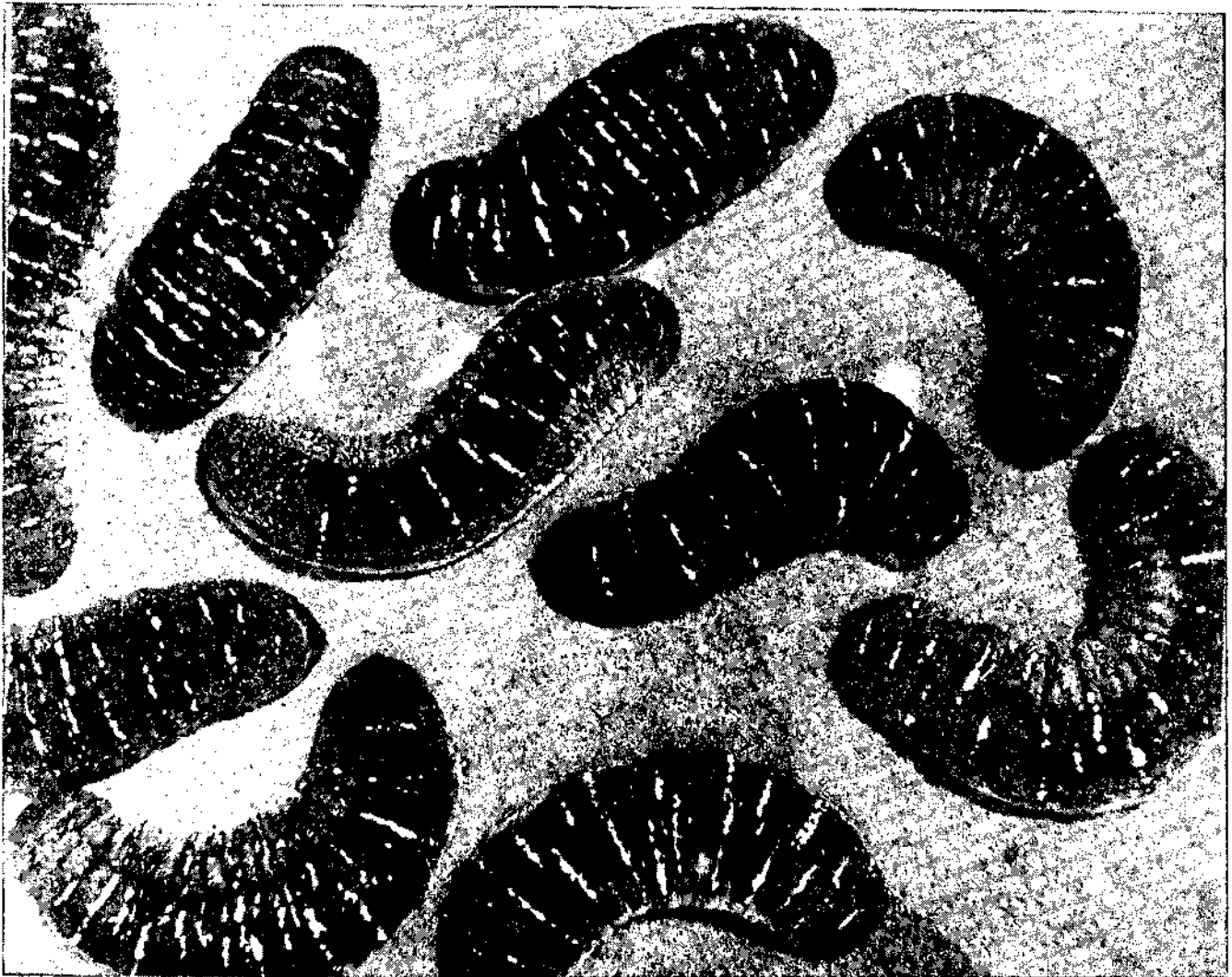


Fig. 1. A group of adult *Holothuria (Metriatyla) scabra*.

(Photo: Mr. M. Kathirvel)

as a measure of conservation. As a result of this ban the *beche-de-mer* industry is facing a crisis in this country.

At this juncture the Central Marine Fisheries Research Institute, ventured upon a programme on the artificial breeding and production of seed for culture and propagation of the commercially valuable holothurian species. The Institute's success on the above aspects under controlled conditions is significant which may eventually solve the problems presently faced by the *beche-de-mer* industry in India. This is the first time that such work is carried out in India.

Large specimens of *Holothuria (Metriatyla) scabra* (300-350 mm/ 500-600 g) were brought to the laboratory in the last week of January, '88 and they were acclimatised to the laboratory conditions (Fig. 1). Various

attempts were made to induce them to spawn in the laboratory such as subjecting them to mild electric shocks, manipulating the salinity and giving injections of radial nerve extracts of the star fish *Pentaceraster regulus*. Finally success was achieved by thermal stimulation.

On 6-2-'88 at 1030 hrs five specimens of *Holothuria (Metriatyla) scabra* were introduced into 70 litres of sea water at 32°C. The normal temperature of sea water in the laboratory was 27°C under which 10 specimens were maintained as control. Another lot of five specimens were put in sea water at 37°C. After ninety minutes one male in the first lot liberated the sperms in the form of white threads which later got mixed with the sea water. This male was immediately removed and placed in normal sea water to allow it to continue spawning. Simultaneously another male

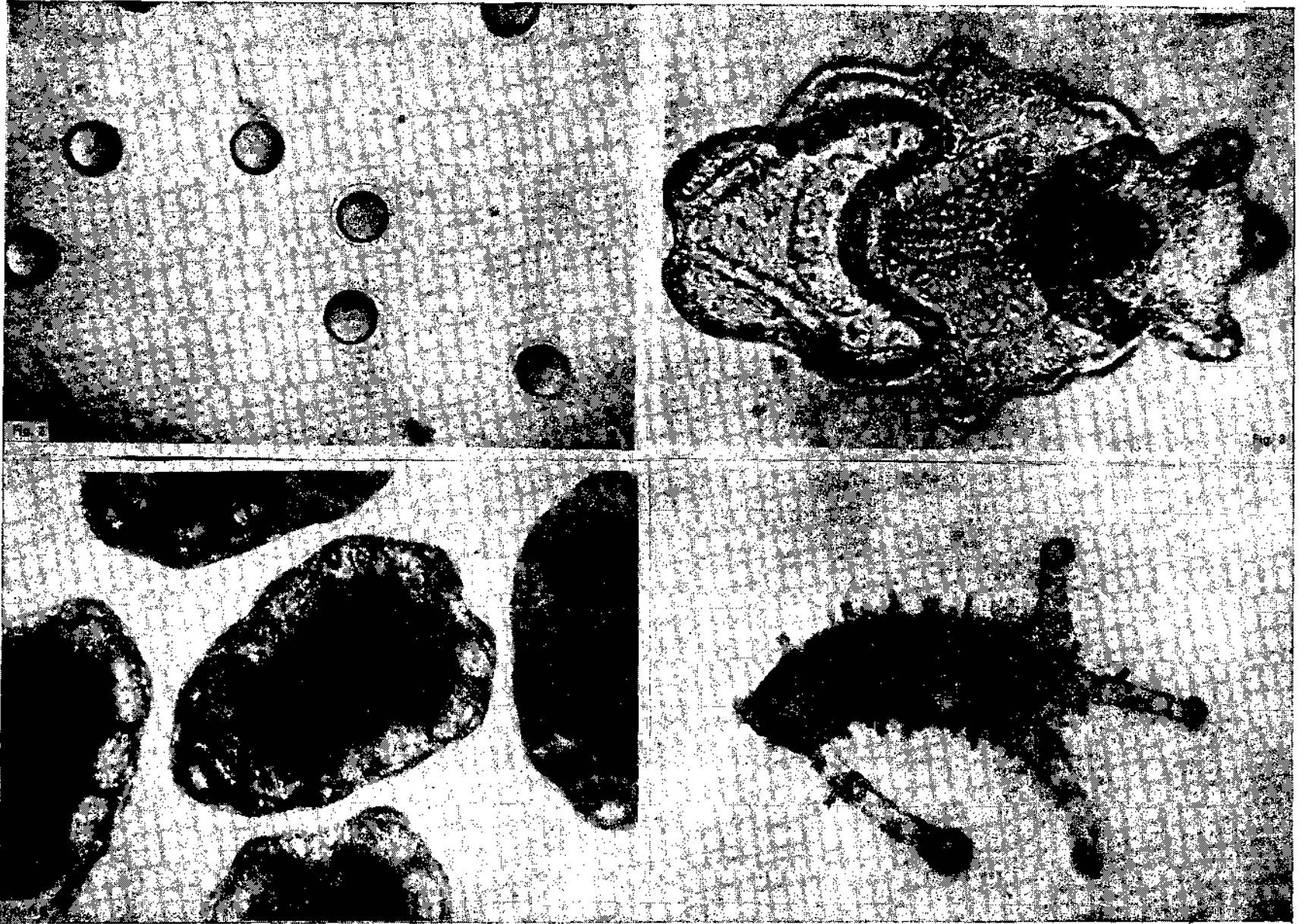


Fig. 2. A group of eggs.
 Fig. 4. Doliolaria larva.

Fig. 3. Auricularia larva.
 Fig. 5. Pentactula larva.
 (Photographs by: Mr. M. E. Rajapandian)

under 37°C spawned and this was also put in normal sea water separately. Both the specimens continued to spawn for 15–20 minutes. On completion of spawning the sperm suspension was transferred to a beaker and the same was poured into a tank with sea water of normal temperature. Into this tank the remaining eight specimens were introduced. The sperms induced a female to spawn in a few spurts. The eggs (Fig. 2) were spherical, white and visible to the naked eye and were found floating. The diameter of the eggs varied from 180–200 μ . The number of eggs was estimated at nine lakhs.

After fertilization the eggs underwent cleavage and were transformed into Dipleurula stage which ranged in length from 190–256 μ . The Dipleurula transformed into Auricularia larvae after 24 hours (Fig. 3). They measured 430 μ in length and 280 μ in breadth. The Auricularia were fed on *Isochrysis galbana* and mixed culture dominated by species of diatoms of *Chaetoceros* and *Skeletonema*. The Auricularia larvae actively fed on *Isochrysis galbana*. The mouth region exhibited constant pulsating movements and the yellowish-green concentration of *Isochrysis* in the stomach was seen in circular movement. As days passed on, the Auricularia larvae became more transparent and the lateral projections also became more prominent. On each side there were four lateral projections and at the tip of each projection there was a round structure. The bands also showed a number of pigment spots. The length of the Auricularia larvae at this stage varied from 660 to 1050 μ (average 860 μ) and breadth 240–690 μ (average 500 μ). Some of the Auricularia were smaller in size. A few Auricularia transformed into Doliolaria stage (Fig. 4) on the tenth day. The Doliolaria were barrel-shaped with five bands and with two tentacles projecting out. The posterior portion was slightly tapering. On each side there were five round structures

with ossicle distinct at the posterior end. There were five groups of cilia like structures on each side. The Doliolaria moved fast in the forward direction. Their length varied from 420–570 μ (average 485 μ) and 240 to 390 μ in breadth (average 295 μ).

On the thirteenth day some of the Doliolaria transformed into Pentactula stage (Fig. 5). The body of Pentactula was tubular with five tentacles at the anterior end and with one short stumpy tube-foot at the posterior end. The cloacal opening was distinct. Colour was greenish brown. The length varied from 330 to 750 μ (average 474 μ) and breadth from 250 to 400 μ (average 307 μ). By eighteenth day the tube-feet and tentacles became more distinct and a number of tables were seen in the skin. The tentacles had a web in between them. At the posterior end two long tube-feet were seen. The spires of the tables were projecting out of the skin. The tentacles and tube-feet also had tables sparsely distributed. The length of the specimens varied from 550 to 720 μ (average 656 μ) and breadth varied from 210 to 320 μ (average 262 μ). The Pentactula have the habit of moving to the edge of the tank and remaining just below the surface of water. Soon they settled down to the bottom and started feeding on powdered *Ulva* and *Sargassum*.

The early development of fertilized egg took place on the surface and column of water. From the Dipleurula stage the larvae started feeding on micro-algal cultures. The Auricularia and Doliolaria are planktonic but the Pentactula settles down to the bottom of the tank. The larvae were reared in one tonne tank in filtered and aerated sea water of salinity 32–34‰ and temperature 27–29°C. Water was changed every day. The temperature, pH and salinity were regularly monitored.

