LABORATORY SPAWNING AND LARVAL DEVELOPMENT OF *BABYLONIA SPIRATA* (L.) (NEOGASTROPODA : BUCCINIDAE)

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ABSTRACT

Adult *Babylonia spirata* were collected from Porto Novo coastal waters, southeast coast of India. Spawning and larval development were observed under laboratory conditions. Peak spawning was noticed during post monsoon season (January to March) and extended up to May (summer season). Each *B. spirata* laid 24-35 transparent, vasiform egg capsules attached to the substratum. Each capsule contained about 900 eggs in a jelly like fluid. The bilobed veliger larvae hatched out after 10 days. The larvae were fed with mixed plankton and metamorphosed after 19 days. The juveniles were fed with boiled clam-meat and were reared until 28 days.Then they all died. The cause of this mortality is discussed.

INTRODUCTION

Babylonia spirata commonly called the 'Spiral Babylon' is an economically important gastropod found widely inhabiting the littoral regions of Indian coastal waters, especially the muddy sand bottom at 9 to 27 m. The meat of this gastropod is exported and also consumed by fisherfolks on the southeastern coast of India. The shells of these snails are used in the lime industry and for ornamental purposes. The operculum is exported to foreign countries for manufacturing medicine and perfumes (Thirumalavalavan, 1987). *Babylonia* shells can be seen adorning many houses and shell shops.

Studies on *B. spirata* are scanty even though the gastropod has been much exploited. Thirumalavalavan (1987) studied the morphology and anatomy of *B. spirata* from the Porto Novo coastal waters.

Though the fishery has assumed importance only recently, its continuous exploitation may result in depletion of natural stock and concentrated efforts are needed to have an in-depth study for sustained utilization of this fishery. Restocking through sea-ranching (seafarming) could relieve the stress on the natural stock. Studies related to breeding biology, spawning and larval development are essential for developing techniques for mass production of larvae. Hence, it is planned to study the breeding biology and larval development to have a strong data base and to evolve methods of hatchery production of seeds which would help in the restocking process and encourage the coastal people to take up seafarming.

MATERIALS AND METHODS

Regular monthly collection of *B. spirata* of 5 to 6 cm length were made from Porto Novo coastal waters (Lat. 11° 29'N; Long. 79°46'E) of southeastern coast of India. The animals were maintained in cylindrical tanks of 40 litre capacity filled with filtered seawater; a 5 cm thick layer of beach sand was provided as substratum. Salinity (32 ppt) and pH (8) were maintained constant. The snails were fed with bivalve meat. The egg capsules were placed in a cylindrical plastic tank of 20 litre capacity with filtered seawater, and continuous aeration.The water was replenished daily. Random sampling of egg capsules was made daily and preserved in 5% neutral formalin to study the intracapsular development. The hatched larvae were fed with mixed plankton and water was changed every two days.

RESULTS AND DISCUSSION

Spawning

Two animals of *B. spirata* maintained in the laboratory spawned on 14 & 15 April 1993. Spawning was observed to take place during the night. The

size of the spawners was 5 to 6 cm. The animal which spawned on the first day laid 28 egg capsules and the one which spawned on the second day 24 egg capsules.

Egg capsules

The transparent vasiform egg capsules were deposited individually and attached to the sandy substratum by a long narrow stalk. Each capsule measured 30 to 37 mm in height and 8 to 10 mm in width. The eggs floated in albuminous fluid at the apical end of the capsule. Each capsule contained about 900 eggs, each about 400 µm in diameter.

Larval development

The first batch of larvae was observed moving inside the capsule on 20 April from the egg capsules spawned on 14 April. The next batch hatched the next day from the 2nd batch of egg capsules. Both batches of larvae were cultured separately. The hatching rate of both batches was 80%.

The larvae hatched out through the apical openings 10 days after spawning, and started swimming freely. Newly hatched larvae measured about 416 µm. The larvae had a transparent thin shell and a bilobed velum, bordered with cilia. The larvae were positively phototactic and were planktotrophic.

The larvae escaped through the apical slit running horizontally from one end to the other. When the larvae were ready for hatching, the apical slit split open, paving way for the escape of the larvae. The exact mechanism is not known. It may be due to chemical agents or to an increase in the osmotic pressure (Tattersall, 1920).

After the 4th day the larval size increased to 499 µm. Pigments also appeared in the velar lobes on 6th day, observations of heartbeat and the digestive gland were observed. The size of the the larvae increased to 540 µm.

The velar lobes became enlarged and shell clearly visible. After 9 days the larvae attained the size of 832 µm. The foot appeared after 11 days and the size of the larvae increased to 1040 µm. After 13 days the velar lobes started to disintegrate and the foot was clearly visible.

The size of the larvae was 1331 µm.

The pigments disappeared in the velar lobes and the siphonal canal was observed after 16 days. The larvae mearsured about 1436 µm. Tentacles and eyes were visible. The larvae started settling down. The velar lobes had almost disintegrated and the larvae changed to the crawling mode of life. No special substratum was provided.

After 19 days the larvae completely metamorphosed into juveniles which measured 1872 µm. After 25 days, the juveniles measured about 2.10 mm and were reared to the size of 2.68 mm in 28 days. Mortality occurred only after that.

The planktotrophic larvae were fed mixed plankton culture containing *Chaetoceros* sp., *Nitzschia* sp., *Rhizosolenia* sp. and *Pleurosigma* sp. during the early hours of the day and in the evening. The juveniles were fed with boiled clam-meat. The larvae were reared at a density of 50 larvae/l. After hatching, during the first 7 days of development, mortality was nil. On the 8th day, 50% of the larvae died. The survival rate further decreased to 20% at the time of metamorphosis after 18 and 19 days, respectively.

Unexpected outbreak of protozoans was observed on the 8th day and this may account for the 50% mortality of the larvae. The surviving larvae were immediately transferred to fresh filtered sea water and treated with Streptomycin at a concentration of 0.75 mg/l. No mortality was observed during this treatment process. The mortality rate observed during metamorphosis could not be exactly accounted for and it may be due to the lack of proper nutrients and substratum. Similar, heavy mortality during metamorphosis was observed in *Chicoreus ramosus* larvae (Xavier Ramesh *et al.*, 1992)

This study has given the hope that *B. spirata* larvae can be reared successfully after necessary improvements of the rearing techniques and selection of suitable larval feed and substratum. It is planned to continue the work early in 1994 to improve the techniques and to pave the way for successful culture of *B. spirata* larvae.

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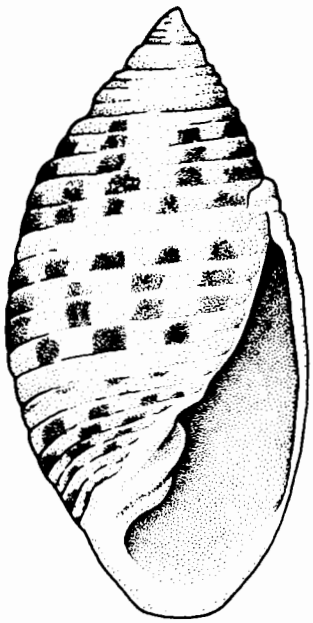

Pupa solidula (L., 1758).
Drawing by Patairat Singdam.