The pulmonate salt marsh snail *Pythia plicata* inhabits the intertidal region of Pitchavaram mangroves, Tamil Nadu (Lat. 11° 29' N; Long. 79° 49' E). This snail followed a lunar cycle in egg laying and hatching and it had a benthic veliger. Only Shanmugam and Kasi-nathan (1987) have worked on the reproduction of pulmonate salt marsh snail in the Indian mangroves.

The egg masses of *Pythia plicata* were collected just 1 day before or on the new and fullmoon day itself. Egg masses were kept in the petridishes and placed over filter paper. The petridishes were flooded once a day with distilled water and filtered sea water (50:50) representing roughly the salinity of snail's habitat. The extra water was poured out leaving a thin film of water in petridish. The development was observed at room temperature (27°-30°C) under a stereozoom binocular microscope and camera lucida drawings of different stages were made. The completion of nearly 80-90% of each stage of cleavage was taken as an index of time taken for that stage to develop.

Eggs were laid in masses with a brown mucus layer on the upperside. They were just embedded in the mud hanging as beads from this upper gelatinous layer. The egg was about 0.5 mm long and about 0.25 mm wide. A single egg mass contained 25-40 eggs. The egg capsule had 2 layers, the outer layer was continuous with the inner one through a constriction or 'neck'. The inner layer had 2 chalazae, one on each end connecting the neighbouring capsules. The chalazae helped in keeping the eggs in position. One of the ends of the egg was narrower than the other end.

Spiral cleavage was observed in the egg as soon as it was laid in the mud. Different stages of development are shown in Fig. 1. The first cleavage divided the egg equally and meridionally into 2 cells. The 4-celled stage was seen after 5-6 hrs of the egg laying. After 2.30 hr of it the 8-celled stage was observed. The 12-celled stage developed after another hour and the multicellular stage (or blastula) after 45 min of this stage, i.e.; approximately 9-11 hr after egg laying. Trochophore was seen on the fifth day. The veligers came out in 13-15 days in a single hooling per day. However, in the field the veligers could be collected in 12-14 days.

In the laboratory the development of the egg could be maintained successfully up to the veliger stage only. Their metamorphosis into juveniles could not be observed. From the field collections it was found that the hatched out benthic veligers metamorphosed 3-6 weeks after the egg laying. The pre-hatching veliger had an oval-shaped operculum with 2 ciliated velar lobes. The veligers rotated actively in an anticlockwise direction inside the egg. The breaking up of the capsule during hatching included the combined effort caused by the operculum and the velum.
Fig. 1. Developmental stages of *Pylhia plicata* egg. Al, Alumen; CI, cilia; CW, capsule wall; Eg, egg; F, foot; M, mouth; VI, velum; VS, veliger shell.

*P. plicata* is oviparous like other pulmonal snails. The number and size of eggs produced vary from snail to snail. *P. plicata* laid 25 egg clusters with each cluster having 25-40 eggs but *Ovatella myosotis* laid 35-50 eggs in one cluster (Morton 1955).

In *O. myosotis* the eggs were ovoid with chalaziform process (Morton 1955). The chalaziform process was absent in another ellobiid snail *Leucophyila* (Morton 1955). The capsules or protective coalings, as found in *P. plicata* was missing in *Melampus bidentatus* (Russel-Hunter et al. 1972) and *M. ceylonicus* (Shanmugam and Kasinathan 1987).

In *P. plicata*, the incubation period was of 13-15 days in the laboratory and 12-14 days in the field after which the veligers came out from the eggs. In *Limnaea truncatula* the eggs took an average of 20 days for hatching (Walton and Jones 1926). In *M. bidentatus* early blastula appeared by 12 hrs and the veliger was observed on 11th day (Russell-Hunter et al. 1972). But in *P. plicata* the blastula resulted in 9-11 hr at 27°-30°C. A true trochophore was seen in *M. bidentatus* on the fourth day whereas in *P. plicata* it occurred on the fifth day at 27°-30°C.

Shanmugam and Kasinathan (1987) reported that the eggs of *M. ceylonicus* look on an average 13-15 days to hatch. The blastula could be seen after 9-12 hr at 27°-30°C. A true trochophore was seen by the fourth day.
In contrast to *P. plicata*, which released benthic veligers, the *M. ceylonicus* released a planktonic veliger. But *M. ceylonicus* agreed with *P. plicata* in the duration (3–6 weeks) for the veliger to settle and metamorphose into juvenile.

In *O. myosotis*, Morton (1955) found that the velum consisted of a pair of simple, rounded lobes and, as in *P. plicata*, with dark grey or black pigment along the margin. In *P. plicata* the velar lobes were provided with cilia around their margin. In *M. ceylonicus* also a pair of simple, ciliated and rounded velar lobes were present (Shanmugam and Kasinathan 1987). These active veligers were rotating in anticlockwise direction inside the eggs.

ACKNOWLEDGEMENTS

The author thanks the Director, Centre of Advanced Study in Marine Biology, Pari-

ngapatla, for providing all facilities and Dr R Kasinathan, Reader, for his timely help. Thanks are also due to the Man and Biosphere Committee, Department of Environment, New Delhi, for the financial assistance.

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