COMPARATIVE MORPHOLOGY OF EGG CAPSULES AND FECUNDITY OF CHICOREUS RAMOSUS FROM DIFFERENT LOCALITIES

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ABSTRACT

Morphology of egg capsules of Chicoreus ramosus in Phuket areas is described for comparison to those reported by D'Asaro (1991) from different localities. Fecundity of seven snails kept in captivity is estimated to range from $6.8 \times 10^4$ to $1.6 \times 10^5$ eggs per individual. The fecundity of C. ramosus in Phuket was relatively high when compared to those reported from different areas in terms of number of egg capsules and eggs.

INTRODUCTION

Chicoreus ramosus is one of the commercially important marine molluscs in Thailand. This muricid snail is widely distributed throughout the Indo-west Pacific (Radwin and D'Attilio, 1976). It has been observed by the fishermen that C. ramosus aggregates to reproduce and lay eggs. On the west coast of Thailand, the snails spawn from June to December (Bussarawit and Ruangchay, 1991). The egg masses are very conspicuous, because they are sticking out from and concentrated on hard substrates (rocks or shells of other individuals). The assembly of egg capsules in clumps among muricid snails has been speculated to have antipredatory purpose (Abe, 1983). In this study, we report the morphology of egg capsules and fecundity of C. ramosus in comparison to those reported elsewhere (D'Asaro, 1991).

MATERIALS AND METHODS

About fifty snails were collected in the Phuket area. All snails were measured for length and weighed. They were kept in cement tanks at Phuket Marine Biological Center, using a flow through system. They were fed daily with bivalves (Meretrix sp.). Only seven snails laid eggs in the tanks. The egg-laying behaviour was observed. The number of egg capsules per mass was counted. Approximately 40-50 egg capsules were sampled from the egg mass. We cut open the egg capsules onto a watch glass and counted the number of eggs to estimate the fecundity.

RESULTS AND DISCUSSION

Egg-capsule Laying Behavior

C. ramosus spawned during both night time and day time. Some spawned capsules continuously. Some spawned for 6-7 days and stopped, and again at the same place. They secreted gelatinous material to secure all the egg mass together on the wall of the cement tank. The egg capsules were arranged in rows. We never witnessed C. ramosus spawning on the shell of a neighbour snail. In nature, we often found egg masses attached on C. ramosus shells.

Morphology of Egg Capsules

D'Asaro (1991) described and illustrated the morphology of egg capsules of numerous muricid species, based on Thorson's collection of muricid specimens. In general, Chicoreus species have similar vase-shaped egg capsules with convex and narrowly concave sides. These features allow capsules to be deposited close together in clumps. Figure 1 illustrates the morphology of an egg capsule deposited by C. ramosus in a tank. The egg capsule is tall, vasi-form in shape with concave and convex sides. The apical surface is more or less triangular and slightly concave. The capsule aperture lies in the
When compared to the morphology of egg capsules from other localities reported by D'Asaro (1991), the structure of egg capsules from Phuket area is basically similar to those from southern India, Seychelles Island, and the Red Sea (Figure 2). The features of egg capsules from Thai waters resemble most those of southern India. The concave sides of the capsules from both areas have a deep groove flanked by ridges.

**Fecundity**

Table 1 presents the fecundity estimates of *C. ramosus* spawning in captivity. The number of egg capsules per egg mass from seven snails we had observed ranged from 205 to 1,214 with mean number of eggs per capsule ranging from 132 to 735. The fecundity was estimated to vary from $6.8 \times 10^3$ to $4.2 \times 10^4$ eggs per snail.

<table>
<thead>
<tr>
<th>Ind.</th>
<th>Weight (g)</th>
<th>No.of Capsules</th>
<th>Mean No.of eggs/capsule (no.of eggs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>400</td>
<td>514</td>
<td>132.6</td>
</tr>
<tr>
<td>2</td>
<td>597</td>
<td>560</td>
<td>282.9</td>
</tr>
<tr>
<td>3</td>
<td>620</td>
<td>1,214</td>
<td>349.6</td>
</tr>
<tr>
<td>4</td>
<td>860</td>
<td>470</td>
<td>735.0</td>
</tr>
<tr>
<td>5</td>
<td>1,057</td>
<td>323</td>
<td>287.8</td>
</tr>
<tr>
<td>6</td>
<td>2,270</td>
<td>205</td>
<td>354.0</td>
</tr>
<tr>
<td>7</td>
<td>2,300</td>
<td>291</td>
<td>333.0</td>
</tr>
</tbody>
</table>

*Data from Bussarawit and Ruangchoy (1991)*

Assuming that egg capsules have a geometric shape of a cone, we are able to obtain the capsule volume. Figure 3 shows the relationship between the number of eggs per capsule and the capsule volume. Despite the poor correlation, it shows a trend of increasing number of eggs with increasing capsule volume.
the Phuket samples collected after the snails spawned in captivity. The fecundity estimated from this study ranged from 68,000 to 158,000 eggs per individual. This is high compared to 11,700 eggs per individual from the Red Sea (Gohar and Eisawy, 1967 [cited after D'Asaro]. They reported 36 capsules with a mean of 325 eggs per capsule.

It is difficult to explain the discrepancies of fecundity of *C. ramosus* from different localities, since the samples collected by Thorson may be too few and incomplete. We speculate that high reproductive outputs of *C. ramosus* from Phuket area might reflect the high productivity and suitability of food resources and habitats harbouring the snail populations.

Figure 4 depicts the relationship between fecundity and total weight of *C. ramosus* which have spawned in captivity. We found that fecundity increased with increasing weight of snails, up to a size about 800 g and then the fecundity declined. It is difficult to interpret the data of this limited number of snails. Generally the reproductive output increases with increasing size. The fitness or reproductive output decreased when the snails got older, which can be attributed to several factors. It is possible that the aging snails have less fitness or the fitness has been reduced due to limited food resources or even parasitism. Parasitism can reduce the reproductive output down to zero in some snails, for example, *Hydrobia* species (Hylleberg, pers. comm.). More specimens are needed to examine to study the snail's reproductive lifetime from first sexual maturation to cessation of reproduction.

We have found that *C. ramosus* in Thai waters has relatively high fecundity, when compared to the snails from other localities reported elsewhere. The morphology of egg capsules from Phuket is similar to those from other areas.
REFERENCES


