LARVAL REARING OF PORTUNID CRAB SCYLLA SERRATA

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Scylla serrata (Forskal), known as mudcrab or alimango, belongs to the Family Portunidae. It is the largest portunid crab and is widely distributed throughout the Indo-West Pacific Region. Its maximum size exceeds 20 cm across the carapace and the crab weighs more than 2 kg.

Studies had been done on the life history, biology, ecology, and culture of this species (Arriola, 1940; Ong, 1965; Dominisac & Dejarme, 1974; Brick, 1974; Chang & Wu, 1985; Chen & Jeng, 1980; Cowan, 1984; Heasman & Fielder, 1983; Motoh, dela Pena & Tampos, 1977; Simon, 1975; Ting & Lin, 1980). But the experiments so far conducted on larval rearing resulted in low yield due to mortality and cannibalism (Ong, 1965; Arriola, 1940; Dominisac & Dejarme, 1974). The present study was conducted to rear *S. serrata zoea* to crab stages with focus on refining the technique to minimize mortality and increase production of hatchery reared juveniles for fishpond culture.

Collection of Spawners

Berried adult and smaller, non-berried crabs (50 g) were collected from Lala, Lanao del Norte and transported in styrofoam boxes filled with one-fourth in volume of brackishwater. The boxes were provided with portable aerators.

Acclimation of Spawners and Juveniles

At the laboratory, berried crabs were acclimated in 0.5 ton fiberglass tanks in preparation for hatching. After three days of acclimation, the berried crabs were placed individually in 100-L capacity fiberglass tanks until hatching occurred.

Broodstock Development

The smaller, unberried crabs were ablated and stocked in a big broodstock concrete tank at 1:1 sex ratio. The females that developed ovaries were transferred individually in 100-L fiber glass for egg hatching. They were fed ad libitum alternately with fresh trash fish, bivalve meat and cow liver. Feeding was done twice daily (8 am & 6 pm). The broodstock tank water was changed completely every two days. Half-moon bricks were used as artificial shelters for the crabs.

Larval Rearing

The newly hatched zoea larvae were stocked at different densities in 100-L fiberglass tanks. The early zoeal stages (first week of rearing) were fed with Brachionus sp., Tetraselmis sp., Skeletonema sp., and eggyolk. On the second week, newly hatched brine shrimp was given as the major feed of the larvae.

Water replenishment in the larval tanks was done daily to insure good culture environment. Water temperature, ammonia, and nitrite, larval development, were monitored. Daily samples and larval stages determination were preserved with 5% Formalin for documentation purposes.

Hatching of Eggs

Fifteen berried crabs were collected in June and July 1990 but none hatched their eggs successfully. Microscopic examination of the

detached egg clusters revealed the presence of large ectoparasites. The ectoparasitic infestation and probably the stress from collection and transport could have caused the unsuccessful hatching. An attempt to prevent abortion was adopted: the berried crabs were dipped for 30 sec in 200 ppm Formalin solution, 1 ppm malachite green and 1 ppm methylene blue upon the delivery of the crabs from Panguil Bay. The dipping was observed to have removed the ectoparasites from the eggs and hatching abortion was minimized.

The unablated, smaller female crabs became berried after 90 days, while the ablated ones (10 individuals), developed ovaries fifteen days after ablation. All the ablated and unablated crabs successfully hatched their eggs to the first zoeal stage. Table 1 below presents the hatching data and larval rearing operations.

Larval Rearing

Of the twenty-three successful batches of larval hatching, only one batch of larvae lasted the 20-days culture period corresponding to the zoea-5 stage of larval development. Majority of the larval rearing operations were terminated after one to eight days (zoea-1 & zoea-2 stages). The mortality of the larvae was attributed to infestations of fungi, bacteria and protozoa on the larvae. General observations were as follows:

1. Dead larvae were attacked by protozoans and nematodes.
2. Some larvae showed degenerated rostrum and swimming legs (bacterial necrosis).
3. Unhatched eggs were wrapped in fungal hyphae.
4. Some eggs were attacked by Epistylis, Zoothamnium & Vorticella.
5. Very low temperature (24°C) during the months of November and December, 1990.

Table 1. Larval rearing of Scylla serrata.

Batch No.	Date Spawned	No. of Zoea Larvae	No. of Days	Larval Stage	Remarks
	(1990)				Attacked by:
1	Aug 31	717,360	4	Zoea-1	Bacteria, Zoothamnium sp. Lagenidium sp. and protozoa
2a	Sept 11	-	8	Zoea-2	Lagenidium sp. and protozoa
2b	Sept 11	2,115,175	8	Zoea-2	Lagenidium sp. and protozoa
3	Sept 12	2,694,800	6	Zoea-2	Protozoa and Epistylis sp.
4	Sept 13	1,373,160	4	Zoea-1	Protozoa, Epistilis and nematodes
5	Sept 21	1,175,600	3	Zoea-1	Protozoa and Vorticella sp.
6	Sept 22	-	2	Zoea-1	Protozoa and Vorticella sp.
7	Sept 25	-	4	Zoea-1	Protozoa and Vorticella sp.
8	Sept 27	-	1	Zoea-1	Overheated (45-60oC)
9	Sept 28	748,000	14	Zoea-3	Epistylis sp. and Zoothamnium sp.
10	Sept 30	-	6	Zoea-2	Protozoa, Zoothamnium sp. nematode
11	Oct 3	-	4	Zoea-1	Epistylis sp.
12	Oct 11	-	18	Zoea-4	Epistylis sp and nematode
13	Oct 14	-	16	Zoea-4	Protozoa and Zoothamnium sp.
14	Oct 15	-	3	Zoea-1	Protozoa and Zoothamnium sp.
15	Oct 18	-	9	Zoea-2	Protozoa and Epistylis sp.
16	Oct 28	-	20	Zoea-5	Very low temperature at night (20-24oC)
17	Dec 13	-	3	Zoea-1	Very low temperature at night (20-24oC)
18	Dec 17	-	6	Zoea-2	Very low temperature at night (20-24oC)
19	Dec 24	-	4	Zoea-1	Very low temperature at night (20-24oC)
20	Dec 26	-	5	Zoea-2	Very low temperature at night (20-24oC)
21	Dec 27	-	6	Zoea-2	Very low temperature at night (20-24oC)
22	Dec 28	-	6	Zoea-2	Very low temperature at night (20-24oC)
23	Dec 31	-	7	Zoea-2	Very low temperature at night (20-24oC)

Treatment to Minimize Larval Mortality

Several treatments were made to prevent or reduce the mortality of the larvae. Single treatment using either 0.03 ppm methylene blue or 0.03 ppm treflan or 2.o ppm Formalin was employed. A triple dose was also done using a combination of 0.002 ppm malachite green, 0.01 ppm methylene blue and 0.03 ppm oxytet-racycline. The Brachionus sp. were treated also with 2 ppm malachite green for one hour before they were fed to the larvae.

Water temperature ranged from 24°C to 28°C. But it was during November and December, that the water temperature reached as low as 24°C for longer hours which was apparently too low (very cool) for the larvae. Water heater was intermittently employed to raise the temperature to 30-32°C.

Ammonia and nitrite concentration in the culture water reached as high as 50 and 120 ppm, respectively. Frequent water changed using dechlorinated seawater reduced the ammonia and nitrite concentrations to 5 and 10 ppm, respectively.

Preliminary investigations on the stocking density and food types were conducted. Stocking densities of 50, 100, 200 and 300 larvae/L were tried. Different feeds and their combination were also tried such as Brachionus sp., Brachionus sp. + Tetraselmis eggyolk, non-fat powder milk, and newly-hatched brine shrimps.

All treatments yielded mortalities of larvae at various stages of development.

Despite all the treatments tested and preventive measures undertaken, the mortality of the larvae remained a big problem. Hence, scheduled future studies will be addressed to:

1. Minimize stress and eliminate Lagenidium, Epistylis, Zoothamnium and protozoa; and
2. Reduce the levels of ammonia and nitrite in culture water from more than 10 ppm to less than 1 ppm.

These studies will be conducted in culture water with temperature levels to be monitored between 30-32°C.

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