

1977

Laboratory breeding of the mud crab *Scylla serrata* (Forsk.) through the zoea and megalopa stages to the crab stage

Motoh, Hiroshi

Aquaculture Department, Southeast Asian Fisheries Development Center

Motoh, H., de la Peña, D., & Tampos, E. (1977). Laboratory breeding of the mud crab *Scylla serrata* (Forsk.) through the zoea and megalopa stages to the crab stage. SEAFDEC Aquaculture Department Quarterly Research Report, 1(4), 14-18.

<http://hdl.handle.net/10862/2306>

Downloaded from <http://repository.seafdec.org.ph>, SEAFDEC/AQD's Institutional Repository

Laboratory breeding of the mud crab *Scylla serrata* (Forsk.) through the zoea and megalopa stages to the crab stage.

Hiroshi Motoh, Dioscoro de la Peña, and Edmond Tampos

Basic studies on the breeding of the mud crab *Scylla serrata* had been done, but extant documents of the experiments are not many. The life history of *S. serrata* had been studied by Arriola (1940) and by Raja Bai Naidu (1955); and its taxonomy by Estampador (1949a, 1949b). In Malaysia, Ong (1964, 1966) succeeded in rearing the mud crab in all its stages.

A series of experiments are being conducted to establish breeding techniques to mass-produce seedlings of the *S. serrata* for pond cultivation to fill the great commercial demand of this high-priced food item. The objective is to breed the crab through the 5 zoea stages and 1 megalopa stage, to the crab stage.

One ovigerous crab with 128 mm carapace length was caught in the SEAFDEC pond at Leganes, Iloilo on Nov. 2, 1977. On the same day it was transported in seawater to the Wet Laboratory in the Tigbauan station and placed in an 800-L fiber reinforced plastic (FRP) tank filled with seawater and mildly aerated. Every morning a maximum of 25% of the total volume of water was changed. The crab was adequately fed with mussel and shrimp meat. The tank was covered and darkened to minimize physical stress on the animal.

On Nov. 12, eggs started hatching as zoeae. About 10:00 a.m. of the same day, while hatching was still in progress, an estimated 114,000 first zoea larvae were distributed to 8 tanks of 800-L capacity each, with mild aeration. Feeds were *Artemia salina* nauplii and *Brachionus plicatilis*. Prophylactic treatment was done with powder penicillin and streptomycin. In the afternoon of the same day, 250 mg of streptomycin and 150 mg of penicillin G sodium was added to each tank, and this treatment was repeated every other day. Rearing water volume was changed at a maximum of 33% every day. Stocking density varied from 10 to 90 zoeae per liter of rearing water. After molting to the crab stage, the crabs were kept individually in small glass aquaria to avoid cannibalism. Water temperature ranged from 24.5 to 29.1°C, while salinity was kept at 28 to 33 ppt.

Zoea stage. The cephalothorax of zoea had 4 spines: 1 dorsal, 1 rostral, and 2 short lateral (Fig. 1). All zoeae, except for the first stage, had stalked compound eyes. The abdomen in all zoea stages had lateral knobs on the 2nd and 3rd segments. Body length varied from 1.2 to 3.5 mm, according to the stages of development. Heavy mortality occurred during the 1st, 2nd, and 5th zoea stages.

Megalopa stage. 51 megalopae were produced. A megalopa looked like a crab (Figs. 2 and 3), and could swim by means of 5 pairs of pleopods, which had become functional for the first time. The megalopae alternately rested on the tank bottom or swam around. They had pairs of prominent chilipeds. Carapace length including rostral spine was about 2.3 mm and carapace breadth was 1.6 mm. This stage lasted for 8 to 10 days, and was the longest among all molting stages. Heavy mortality occurred during this stage.

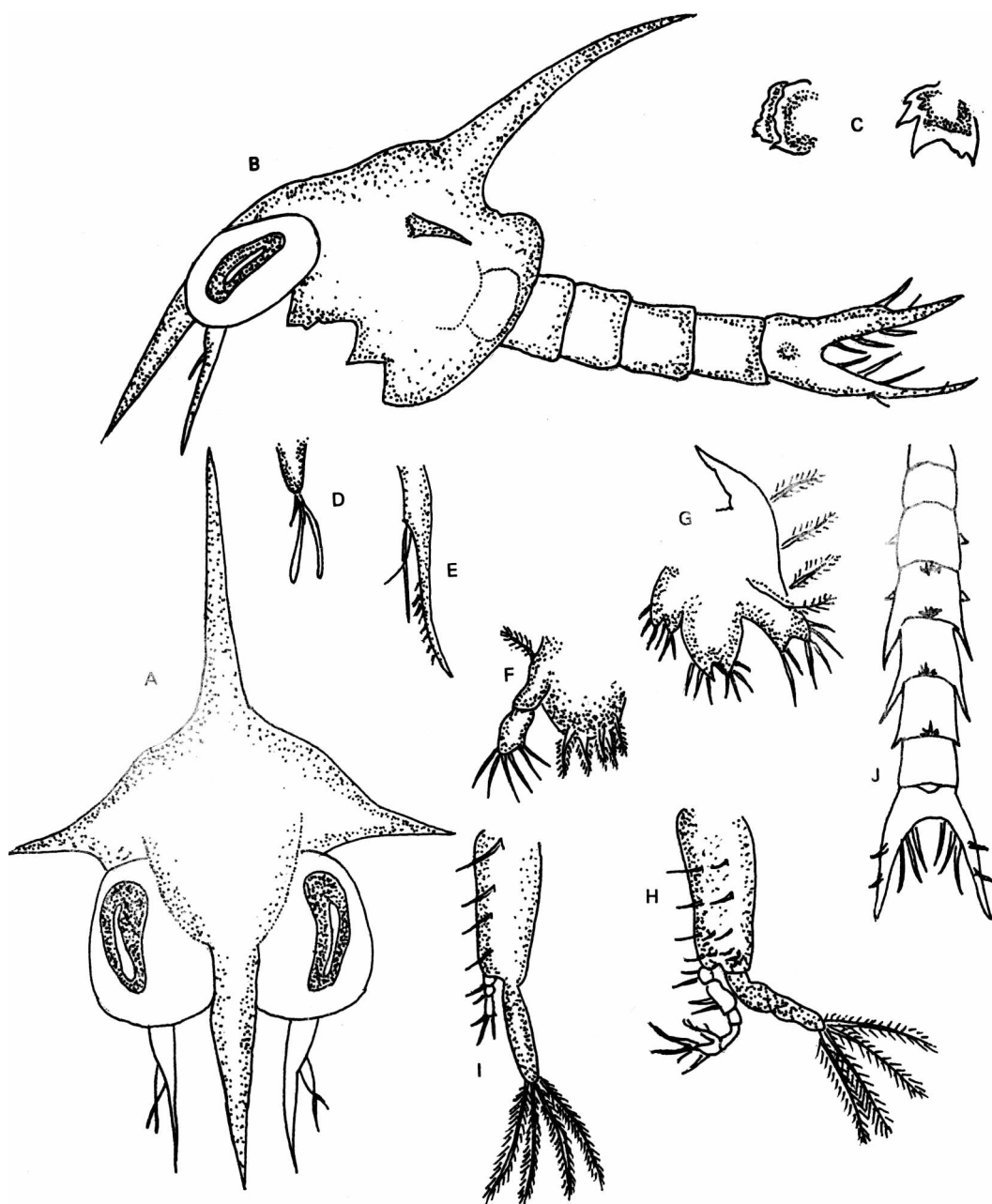


Fig. 1. Diagrams of the first zoea of *Scylla serrata*: A, frontal view; B, lateral view; C, mandible; D, antennule; E, antenna; F, maxillule; G, maxilla; H, first maxilliped; I, second maxilliped; and J, abdomen.

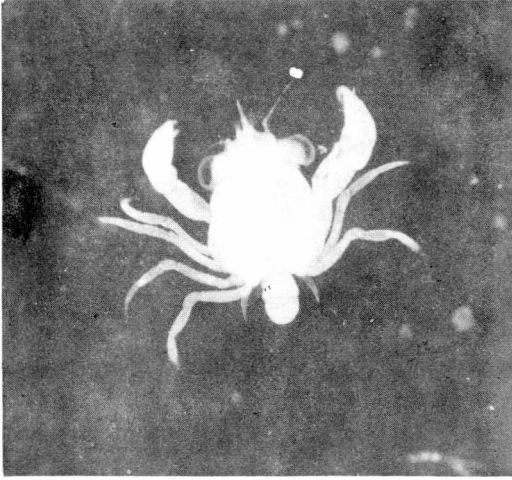
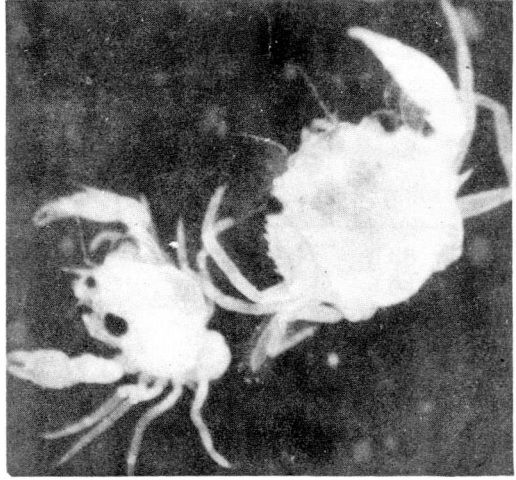


Fig. 2. Megalopa.



**Fig. 3. Megalopa, lateral view (left);
and first crab stage (right).**

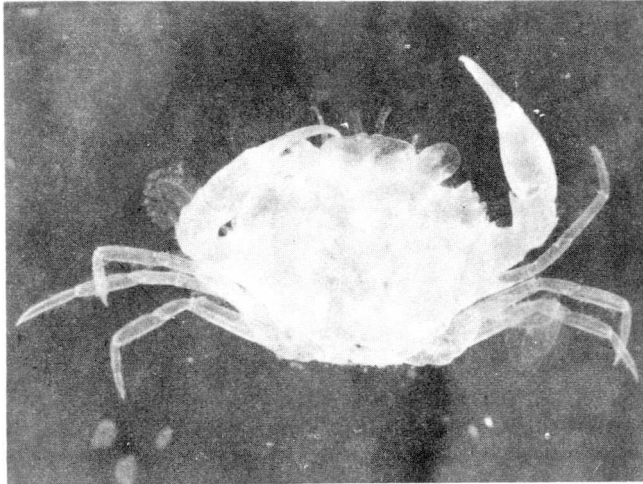


Fig. 4. Second crab stage.

Table 1. Data on development and survival of larva and early crab stage of alimango *Scylla serrata* in captivity, 1977.

| Date (1977) | Larva or crab stage | Period (day) on each stage | Accumulated period (day) | Survival (%) on each stage | Accumulated survival (%) |
|-------------|---------------------|----------------------------|--------------------------|----------------------------|--------------------------|
| Nov. 12-16 | First zoea | 4 – 5 | 4 – 5 | 9.5 | 9.5 |
| 17-20 | Second zoea | 3 – 4 | 7 – 9 | 14.7 | 1.5 |
| 20-23 | Third zoea | 3 | 10 – 12 | 71.4 | 1.0 |
| 23-26 | Fourth zoea | 3 | 13 – 15 | 70.0 | 0.7 |
| 25-30 | Fifth zoea | 4 – 6 | 17 – 21 | 28.6 | 0.2 |
| 30-Dec. 9 | Megalopa | 8 – 10 | 25 – 31 | 10.0 | 0.002 |
| Dec. 9-14 | First Crab | 5 – 6 | 30 – 37 | 100.0 | 0.002 |
| 12-18 | Second Crab | 3 – 4 | 33 – 41 | 100.00 | 0.002 |
| 16-23 | Third Crab | 5 – 6 | 38 – 47 | 100.0 | 0.002 |
| | Fourth Crab | Ongoing | Ongoing | Ongoing | Ongoing |

Crab stage. Within 1 month after hatching, 20 megalopae molted to the 1st crab stage. Carapace length in this stage was about 3.0 mm, while carapace breadth was 3.5 mm, with slight variations. They molted after 5 or 6 days to be 2nd crab stage (Fig. 4), with carapace length of 4.0 mm and breadth of 5.1 mm. After another 3 or 4 days, they molted to the 3rd crab stage, now with breadth of 7.8 mm. There was no mortality in the rearing setup of 1 crab per aquarium for more than 20 days (Table 1).

Mortality during the 1st and 2nd zoea stages is now attributed to unfavorable rearing conditions including heavy feeding, and to the zoeae's positive phototaxis which caused them stress. From the 5th zoea stage onward, mortality is attributed mainly to cannibalism. Survival can be improved in standardized production of *S. serrata* for pond cultivation.

Literature Cited

- Arriola, F. J. 1940. A preliminary study on the life history of *Scylla serrata*. Phil. J. Sci., 73(4):437-456.
- Estampador, E. P. 1949a. Studies on *Scylla* (Crustacea: Portunidae). I. Revision of the genus. Phil. J. Sci., 78(1):95-108.
- Estampador, E. P. 1949b. *Scylla* (Crustacea: Portunidae): II. Comparative studies on spermatogenesis and oogenesis. Phil. J. Sci., 78(3):301-353.
- Ong, K. S. 1964. The early developmental stages of *Scylla serrata* Forskal (Crustacea: Portunidae), reared in the laboratory. Proc., Indo-Pacif. Fish. Coun. 2(2):135-146.
- Ong, K. S. 1966. Observations on the postlarval life history of *Scylla serrata* Forskal reared in the laboratory. Malays. Agric., 45(4).
- Raja Bai Naidu, K. G. 1955. The early development of *Scylla serrata* Forskal and *Neptunus sanguinolentus* Herbst. Ind. Fish. 2(1):67-76.

