Preliminary report on the first production of the crab stages of alimasag, Portunus pelagicus (Linnaeus)

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Preliminary report on the first production of the crab stages of alimasag. *Portunus pelagicus* (Linnaeus)

H. Motoh, D. de la Peña, M. Dimaano and E. Tampos

Alimasag, *Portunus pelagicus,* has been reared successfully from an ovigerous female to the crab stage for the first time in the Philippines. Four zoea stages and one megalopa lasting a total of approximately 16 days constitute its complete larval development. Heavy mortalities occurred during the first, third, and fourth zoea and megalopa. Out of about 3,700 megalopae, a total of approximately 1,500 first crab stage were produced.

The swimming crab, *P. pelagicus,* locally termed as alimasag, has a wide distribution and is found in many parts of tropic and subtropic waters with wide sandy shore. In the Philippines it is relished next to alimango, *Scylla serrata* making it a commercially important species and a common source of income for local fishermen. Its market price is relatively lower than that of alimango but varies from one place to another.

Some studies have been done on the breeding (Yatsuzuka, 1962), comparative morphology, and geographical variability (Stephenson, 1968 a, b, c) of *P. pelagicus.* To date, no study has been published on this species in the Philippines.

It is for the purpose of knowing the physico-chemical requirements as well as some biological data of early and later life history of this species that this experiment was conducted. Furthermore, it also aims to gather some information on the rearing techniques for larval propagation of this portunid crab which, hopefully, may apply to all edible crabs.

An ovigerous *P. pelagicus* with a carapace length of 73.2 mm was caught at Villa Beach, Iloilo by a *bintol,* a kind of crab trap made of rattan woven into a hexagonal shape (Fig. 1), with bait consisting of fish or frog meat to attract crabs to the central opening. The trap is tied with stones or other sinkers and attached to a float consisting of either bamboo or pieces of rubber. The flat is connected to the trap with a rope so that the location of the trap can be easily determined.

The eggs attached to the pleopods were still orange so that it took around five days until they hatched. On 21 February, thick swarms of zoea larvae were observed near the water surface of the rearing tank where the mother spawner was kept. The larvae were immediately given rotifer, *Brachionus plicatilis* to avoid starvation. On the same day, two 1-ton FRP (Fiber Reinforced Plastic) tanks were stocked, one with an average density of 60.8 larvae/L (Tank No. 2) and the other with 77.2 larvae/L (Tank No. 3). Larvae with density up to 342 per liter remained in the spawning tank (Tank No. 1).

Practically the three tanks were treated the same except that the two were fed with *Brachionus, Artemia* nauplii and diatom while tank No. 3 was given *Chlorella* instead of diatom.

Water temperature was relatively low from sundown to sunset so that an electric heater was installed. Only one heater was available so that it was transferred from one tank to another to maintain water temperature at about 28°C.

Further addition of food was determined based on their abundance as judged by ocular inspection. When the rearing water became transparent, diatoms were added to tanks 1 and 2 and *Chlorella* to tank 3. Maintenance of rearing water condition was not given much attention and changing of water was done at most every other day from 1/3 to 1/2 of the total volume. Fresh water was added daily to compensate for water loss due to evaporation and to reduce salinity especially during the later stages of the larvae.

Daily larval condition was monitored and larval stage determined. Water temperature range was 25.1 to 28.9°C, while salinity range was from 24.6 to 31 ppt.

Tanks 1 and 2 were supplied with mild aeration while tank 3 was supplied with strong aeration leving the sediments in continuous suspension.

All larvae emerged from the egg as first zoea. \ There are four zoea and one megalopa stages in the complete larval development of *P. pelagicus.* Each zoea stage is distinguished from each other by the number of additional swimming hair of both maxillipeds.

The average percentage survival from the first zoea to first crab was about 0.32% for the last rearing. In view of this result, the practical application to the production of young crabs can be expected.

Table 1. Data on the development and survival of larva and early crab stage of alimasag, ***Portunus pelagicus*** **in captivity, 1978.**

Date (1978)	Larva or crab stage	Period (day) on each stage	Accumulated period (day	Survival % on each stage	Accumulated survival (%)	Actual No. of larvae or crab
Feb. 21-23	First zoea	2-3	2-3	16.4	16.4	480,000
23-25	Second zoea	2-3	4-6	100.0	16.4	78,800
25-March 1	Third zoea	4-5	8-11	25.8	4.2	78,800
March 1-5	Fourth zoea	4-5	12-16	18.6	0.78	20,400
3-10	Megalopa	7-8	19-24	39.9	0.31	3,790
7-13	First crab	4-6	23-30	–	–	1,514*
	Second crab		On-going			

*Most of the crabs on first stage were stocked in two raceways tanks aside from some in small aquaria for molting experiment to determine growth and development, so that survival from this stage and thereafter can not be dtermined. d

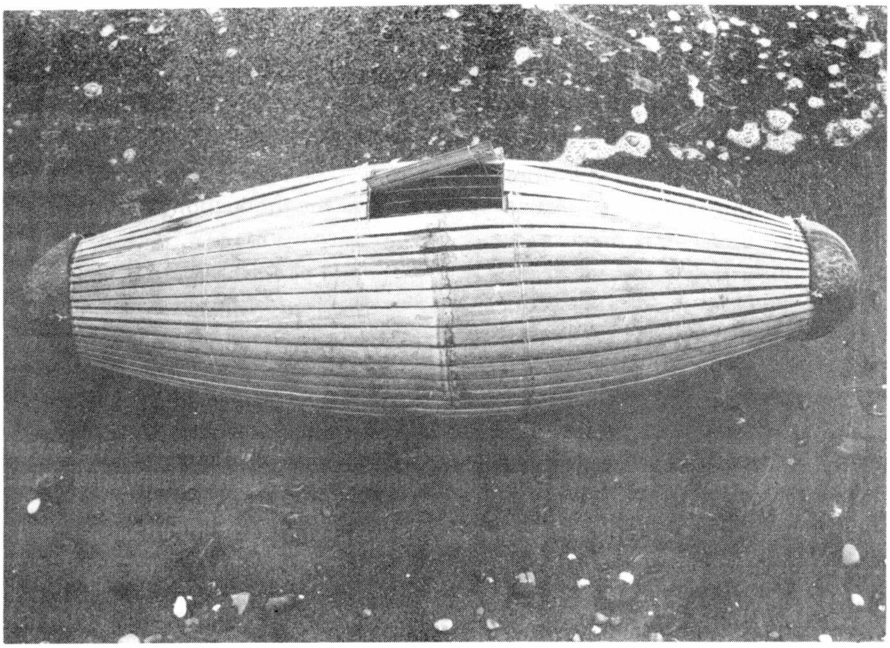

Fig. 1. Crab trap, "bintol".

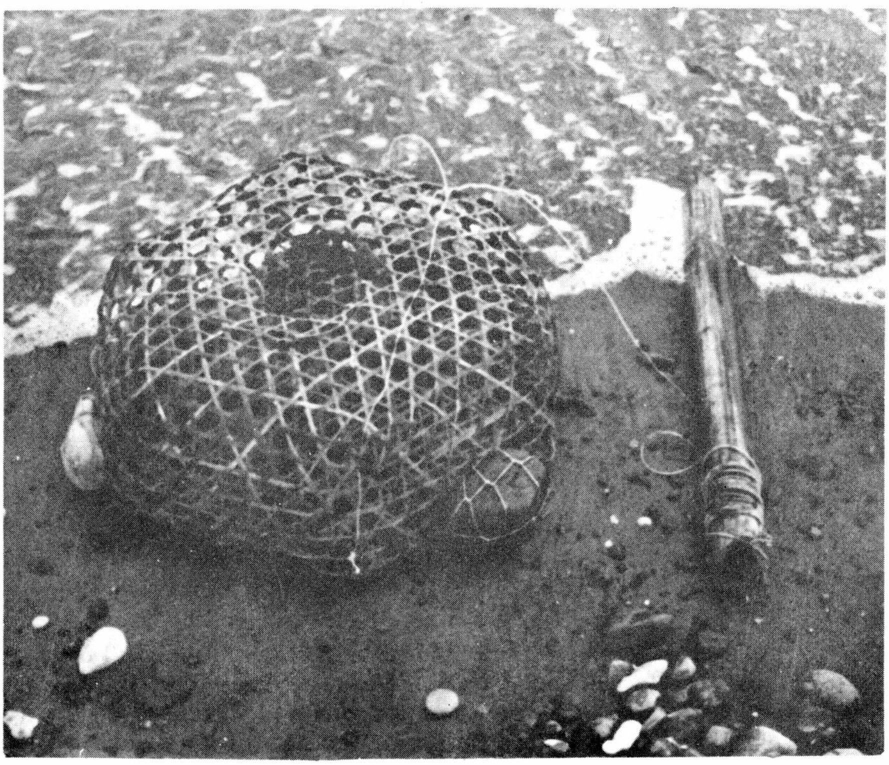

Fig. 2. Live crab cage.

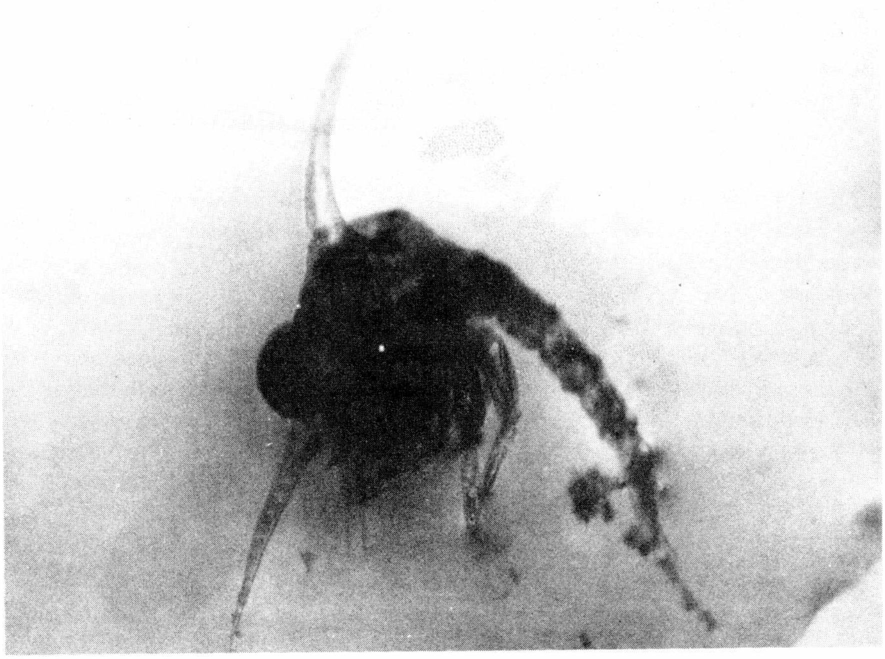

Fig. 3. Third zoea.

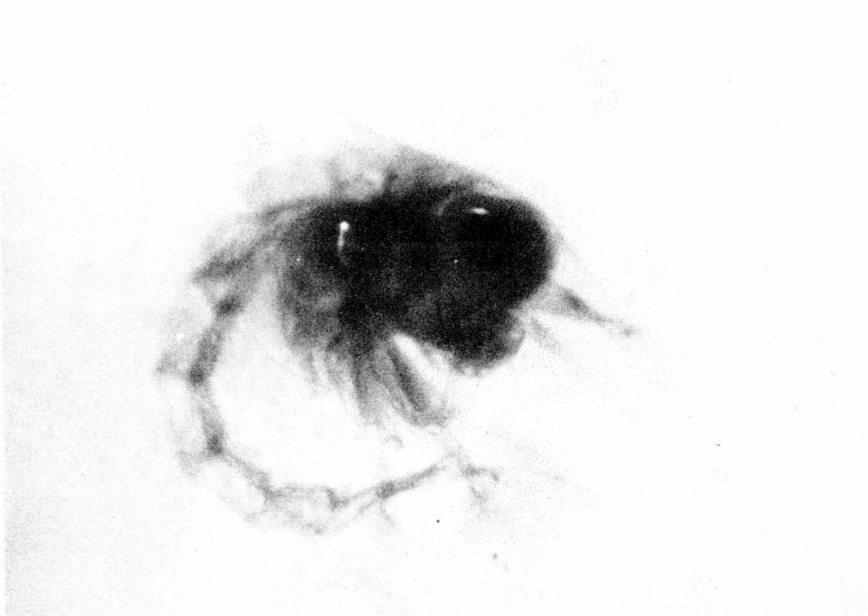

Fig. 4. Fourth zoea.

Fig. 5. Dorsal view of megalopa.

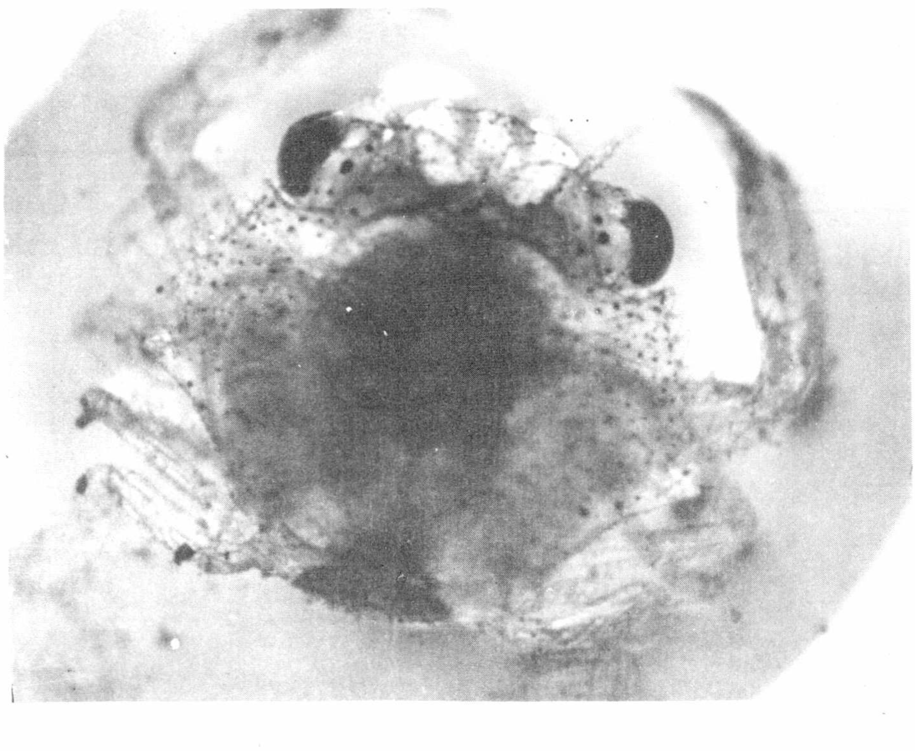

Fig. 6. Dorsal view of first crab stage.

Rearing condition was very good as indicated by the larvae passing only four zoeal stages. However, larvae in tanks 1 and 2 died abruptly. Complete mortality was noted the following day, although larvae in tank 1 died a day earlier. Examination of dead larvae showed bacterial infection but then mass mortality can not be fully attributed to it since live larvae were not heavily infected with bacteria. Probably mass mortality was caused by an abrupt change in the physico-chemical conditions of the rearing water which may have occurred between sunset to sunrise.

Rearing water in tank 3 (with larvae passing only four zoeal stages) was quite dirty since sediments, which include feces of *Artemia* adults, float and were circulated together with the larvae. Continuous circulation was facilitated by strong aeration consisting of three airstones lined across the tank's length. There was no notable bacterial nor fungal infection on live larvae, however, the tank was treated with 9-gram streptomycin sulfate in powder preparation on 1 March as a preventive measure.

Based upon this experiment, *Chlorella* is better than diatom for use in larval culture of crabs serving as food, and at the same time maintaining the quality of the rearing water.

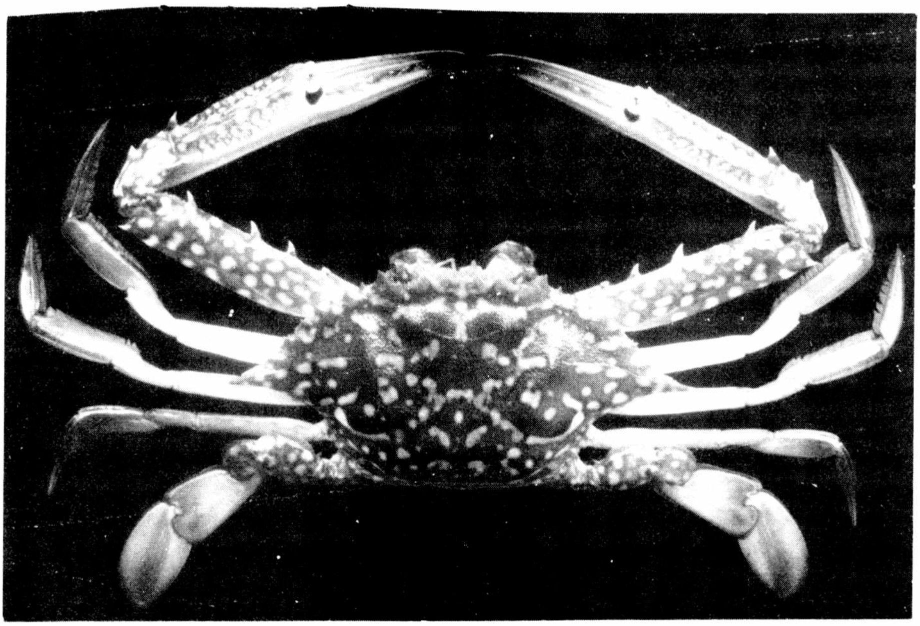

Figure 7. Male of *Portunus pelagicus*

REFERENCES

Stephenson, W. et al. 1968a. Numerical approaches to the relationships by certain American swimming crabs (Crustacea: Portunidae). Proc. W. S. Nat'l. Museum, 124 (3645): 1-25.

Stephenson, W. 1968b. Studies on *Portunus pelagicus* (Linnaeus) and *P. sanguinolentus* (Herbst). Occasional Papers of Bernice P. Bishop Museum, 23(15): 384-397.

Stephenson, W. 1968c. Variability in the sand crab *Portunus pelagicus* (Linnaeus) (Crustacea: Portunidae). Memoirs of the Queensland Museum, 15:83-397.

Yatsuzuka, K. 1962. Studies on the artificial rearing of the larvael Brachyura, especially of the larval blue-crab *Neptunus pelagicus* (Linneaus). Reports of the USA Marine Biological Station 9(1): 1-4.