

STUDIES ON SOME ASPECTS OF REPRODUCTION OF
MUD CRAB, *SCYLLA SERRATA* (FORSKAL)

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MASTER OF SCIENCE
UNIVERSITI PUTRA MALAYSIA

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By

TRAN NGOC HAI

**Thesis Submitted in Fulfillment of the Requirements
for the Degree of Master of Science in the
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LIST OF ABBREVIATIONS

BL:	Body Length
BW:	Body Weight
C1:	Crab1 Stage
C2:	Crab2 Stage
C3:	Crab3 Stage
C4:	Crab4 Stage
C5:	Crab5 Stage
C6:	Crab6 Stage
C7:	Crab7 Stage
CL:	Carapace Length
CW:	Carapace Width
D:	Dark
L:	Light
M:	Megalopa Stage
Z1:	Zoea1 Stage
Z2:	Zoea2 Stage
Z3:	Zoea3 Stage
Z4:	Zoea4 Stage
Z5:	Zoea5 Stage

Abstract of thesis submitted to the Senate of Universiti Putra Malaysia in fulfillment of requirements for the degree of Master of Science .

**STUDIES ON SOME ASPECTS OF REPRODUCTION OF
MUD CRAB, *SCYLLA SERRATA* (FORSKAL)**

By

Tran Ngoc Hai

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Chairman: Dr. Anuar B. Hassan

Faculty: Faculty of Applied Science and Technology

Some aspects on reproduction of mud crab, *Scylla serrata*, in captive conditions were studied. By ablation of bilateral eyestalks of the female, 14 batches of eggs were spawned after 5 days of culture in fiberglass tanks. Spawning occurred at any time of day, month and year. Majority of crabs spawned without undergoing molting and mating under culture condition. Crab spawners were mainly in size of 201-300 g. Average fecundity was 1479992.12 ± 17.03 eggs / crab. However, many eggs could not adhere to the pleopods of the female but fell on the bottom of the tanks. Regression between body weight of female and fecundity was significant ($p < 0.05$). In addition, the second spawning of the crabs under captivity was also observed.

Incubation period of eggs lasted for 9.71 days (9-12 days) and hatching process took 27.71 hours (8-60 hours) in conditions of water temperature of 25-31°C, salinity of 27.5-30 ppt, DO of 6.2-6.8 ppm, and ammonia of 0.02 ppm. Duration for incubation and hatching was significantly related to water temperature ($p < 0.05$). In salinity range of 0-40 ppt, crab eggs could hatch in salinity of 20-40 ppt but the optimal was 30 ppt. In addition, artificial incubation of eggs with incubating density increasing from 762.4 to 48793.6 egg/liter gave hatching rate decreasing from $65.77 \pm 6.52\%$ to $16.66 \pm 1.31\%$.

In rearing larvae of mud crabs, under photoperiods of 24 hr L : 0 hr D, 18 hr L : 6 hr D, 12 hr L : 12 hr D, 6 hr L : 18 hr D and 0 hr L : 24 hr D, metamorphosis, growth and survival of crab larvae were significantly effected. Metamorphosis of larvae was significantly delayed under photoperiods of 6 hr L : 18 hr D and especially 0 hr L : 24 hr D in comparison with larvae under the other photoperiod conditions ($P < 0.05$). There was no significant difference in body length of larvae between the treatments with exception of that in Zoea₅. Larvae under photoperiods of 0 hr L : 24 hr D and 6 hr L : 18 hr D all died at Zoea₂ and Megalope stage, respectively. Meanwhile, under 24 hr L : 0 hr D, 18 hr L : 6 hr D and 12 hr L : 12 hr D, survival rate of larvae was rather high until Zoea₅ but extremely dropped thereafter. Photoperiods of 24 hr L : 0 hr D, 18 hr L : 6 hr D and 12 hr L : 12 hr D were recommended for mud crab larval rearing.

Under different conditions of light intensity ; 0 lux (completely darkness), 300-350 lux, 1500-2000 lux, 4500-6000 lux and under transparent roof, metamorphosis were significantly delayed for larvae under completely darkness and 300-350 lux. There were no significant difference in body length of larvae under different lighting intensity. However, from Zoea₅ onwards, body

length of larvae under 4500-6000 lux and under transparent roof were significantly longer than that of larvae under other treatments. Larvae under completely darkness and 300-350 lux all died at Zoea₁ and Megalope stage, respectively. Survival rate of larvae under 4500-6000 lux and transparent roof were found significantly higher than one under other treatments. Lighting intensity of 4500-6000 lux and under transparent roof were thus suitable for larval rearing of mud crabs.

With different feeding regimes for the larvae, the results showed that larvae fed with green water only or fed with green water plus artificial plankton and prepared feed was not significantly different from the control (no feeding) and that all died at Zoea₁ after 3 days of culture. Larvae fed with green water, rotifer and *Artemia* nauplii or fed with green water, rotifer, artificial plankton, prepared feed and *Artemia* nauplii were similar to larvae fed with green water and *Artemia* nauplii in terms of metamorphosis and growth, but the first achieved survival rate of Zoea better than the later, and the later gave survival rate of Crab₁ stage better than the first. Green water and *Artemia* nauplii thus could be used satisfactory for larval culture.

In rearing crab seeds from Crab₁ to Crab₇ with different salinity from 30 ppt to 0 ppt at intervals of 6 ppt, salinity of 18-30 ppt was found better for crabs in terms of molting, growth and survival rate than other salinity. Crabs could not tolerate freshwater (salinity of 0 ppt) over a period of 2 days.

In culture of crab seed from Crab₁ to Crab₆ fed with trash fish and pellets, crabs fed with pellets gave results comparable with that of crabs fed with trash fish in terms of molting, growth and survival rate.

Abstrak tesis dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi syarat untuk mendapatkan Ijazah Master Sains.

**KAJIAN KE ATAS BEBERAPA ASPEK PEMBIAKAN
KETAM NIPAH, *SCYLLA SERRATA* (FORSKAL)**

Oleh

Tran Ngoc Hai

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Pengerusi: Dr. Anuar B. Hassan

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Kajian ke atas beberapa aspek pembiakan ketam nipah (*Scylla serrata*) telah dijalankan di pusat penetasan. Dengan cara pemotongan kedua-dua mata induk betina, sebanyak 14 kali pembiakan telah berlaku yang menghasilkan telur selepas 5 hari ditenak di tangki serabut glas ("*fibreglass*"). Pembiakan berlaku pada bila-bila masa samada mengikut hari, bulan atau tahun. Majoriti ketam-ketam ini membiak tanpa melalui proses persalinan kulit (cengkerang) atau tanpa berpasangan dalam suasana ternakan. Kebanyakan ketam yang membiak adalah pada saiz 201-300 gram. Purata fekunditi ialah 1479992.12 ± 17.03 telur/ketam. Walau bagaimanapun telur tidak melekat pada kaki renang jantan sebaliknya jatuh di dasar tangki. Regressi di antara berat badan ketam dan fekunditi adalah signifikan ($p < 0.05$). Selain daripada itu, pembiakan kali kedua bagi ketam yang dikultur di dalam tangki juga diperhatikan.