THE CULTURE OF TIGER SHRIMPS, *PENAEUS MONODON* (FABRICIUS) IN AN EARTHEN POND AND IN NET CAGES - A COMPARATIVE STUDY

JONI HARYADI. D

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UNIVERSITI MALAYSIA TERENGGANU (UMT)
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By

JONI HARYADI. D

Thesis Submitted in Fulfillment of the Requirements for the Degree of Master of Science in the Faculty of Applied Science and Technology Kolej Universiti Terengganu Universiti Putra Malaysia

August 2000

THIS THESIS IS DEDICATED TO MY PARENTS,
MY BROTHERS AND SISTER AND TO ALL THOSE THAT I LOVE

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

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Chairman: Aizam Zainal Abidin, B.Sc. (Kobe) M.Sc. (UPM)

Faculty: Applied Science and Technology

Experiments on the culture of tiger shrimps, *Penaeus monodon* (Fabricius) were conducted in two different systems and locations i.e. in an earthen pond at Universiti Putra Malaysia Terengganu (UPMT) and in net cages at Setiu lagoon. The first experiment was to determine the growth and survival of shrimps reared in an earthen pond. The second experiment was to investigate the socio-economic feasibility of shrimp in net cage culture as a new culture activity and to determine the effects of stocking density on growth, survival and production.

The post larvae of *Penaeus monodon* (PL 20-21) were stocked at 67 pcs per m^2 in a 1200 sq.m. pond with a sandy loam bottom equipped with a 5-hp paddle-wheel. The post larvae with an average initial weight of 0.02 g were fed with a commercial feed.

After 3 months of culture, the average production was 508.8 kg. The mean absolute growth (ABG), specific growth rate (SGR), survival rates (SUR) and food conversion ratio (FCR) were 16.96 g, 6.90 % per day, 1.77 and 41.31% respectively. Average water exchange ranged from 5-10% per day during the three months of culture and was carried out fortnightly.

In this study, the total cost of pond operation was about RM 8,710.44 with profit of about RM 1,689.20 per crop was obtained or RM 8.446.00/ha/crop. This experiment provided an insight on the growth performance of *P. monodon* reared in a brackish water pond.

Three (3) stocking densities i.e.500, 400, 300 individuals per square meter were used in this experiment. Post larvae (PL 23) with a mean weight of 0.021 g were stocked in net cages measuring 1.15m x 1.15m x 1.00 m depth.

After 112 days of culture, the highest mean body weight, absolute and specific growth rates obtained from the stocking density of 300 larvae/m^2 were 6.37 ± 0.32 g, 6,35 ± 0.32 g and 5.35 ± 0.46 % day^{-1} respectively.

The survival rates were 39.84 ± 1.90, 44.11 ± 3.82 and 49.96 ± 0.88% for the stocking densities of 500, 400, and 300 larvae/m^2 respectively. The survival rate for 300 larvae/m^2 was significantly ($P<0.05$) higher compared with the other stocking densities (500 and 400 larvae/m^2). The low survival rates may be caused by cannibalism.

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Production for the stocking densities of 500, 400, and 300 larvae/m^2 were 1.10±0.14, 1.26± 0.07 and 1.34±0.16 kg/cage respectively, while the lowest of food conversion ratio (1.93) was obtained from the stocking density of 300/m^2. This is significantly different ($P<0.05$) from the other stocking densities.

In this study, the economic analysis of production showed that net cage culture was economically feasible to conduct at Setiu lagoon. The values for the NPV, IRR and benefit cost ratio for net cage was RM 1,198.28, above 0 at 10% discount rate and 2.28 respectively.