The Experiment II, 25-30 ×104 Cell Per Ml Feeding For Larval Rearing Index Of Black Tiger Shrimp (Penaeus Monodon)

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Abstract- ***This research paper, the growth and survival of larvae was conducted with different stocking densities of 2500 pieces per tank in concrete tanks of 100 liters culture media for 16 days. During the larval rearing experiments feeds and feeding were conducted with two different types of algal species as live food, namely, Tetraselmis chuii and Dunaliella salina for early iarval stages of zoea and zooplankton (Artemia nauplii) for iate larval stages of mysis onwards. For this experiment, the survival rates were obtained as 55 3% in tank No. 3 fed with Tetraselmis chuii and 60.0% in tank No. 4 fed with Dunaliella salina respectively.***

Indexed Terms- ***Algal, zoea, iarval stages, tank, Tetraselmis chuii***

I. METHODS AND PROCEDURES

The research experiments were carried out at the hatch-ery of Aquatechnology, Biotechnology Department. For the operation, the following methods and procedures were used in facilities preparation of research operation.

a. Preparation of New Seawater

Fresh, clean and pathogens free water is essential in hatch-ery and nursery operation. Because of the backyard hatch-ery obtained in inland area for training and research, sea-water was brought from open sea areas and trucked to the hatchery by the help of plastic gallon jars. Therefore, the seawater is needed to prepare and disinfection for the hatchery and nursery experiment.

b. Sedimentation

The trucked seawater was stored in storage tank and covered the tank with an opaque sheet for 3-5 days. Then siphoned the sediments waste fromthe bottom of the stor-age tank.

c. Chlorination

After removal of the sedimented wastes from the stora$e tank the seawater was disinfected with (65%) chlorine pow-der at the concentration of 10-25 ppm, according to the purity of the seawater. Then the storage tank was provided with strong aeration for 2-3 days.

d. Dechlorination

After 2-3 days of chlorination, stop the aeration for 6-12 hours. Then siphoned the residues (wastes) from the bottom of the storage tank. Take 10 ml seawater sample and treat with (1-2) drops of ortholidine solution, cneckeci forthe pres-ence or absence of chlorine residues. If the seawater sample forms no colour, it shows the present of chlorine residues and need to treat with sodium thiosulphate for dechlorina-tion.

e. Filtration

After dechlorination, the disinfected seawater was pumped into the storage tanks passed through a filter bag of 3-5 p mesh aperture.

f. Treatment

After filtratron, 7-2 ppm of EDTA (chelating agent) was treated and provided with strong aeration for removal of chemical pollutants, like trace metals and other fine debris. After allowing for 1-2 hours for

settlement, the clear disin-fected seawater is ready for used in larviculture and live food algal culture.

g. Preparation of Larval Feeds

In the seed production of Penaeus monodon, one of the most important factors governing survival and growth is the availability of proper food. An understanding of the best items of food relishing and nourishing for the larvae and changing patterns of the feeding habit as the larvae grow towards the advance fry stages is of great importance for successful rearing. Therefore, the larval feeds such as phy-toplankton (algae) and Artemia naupht were prepared for the nursery experiments.

h. Preparation of phytoplankton (algae) culture

For the utilization in larviculture of Penaeus monodon, the mass production of phytoplankton was done with the monospecific pure strain of Teraselmis chuii and Dtmaliella salina.

II. PREPARATION FOR RESEARCH EXPERIMENTS

There are 10 steps of preparation for research experiments.

1. Preparation of Larval Rearing Experiment
2. Preparation of Tanks Facilities
3. Air Supply System
4. Water Supply System
5. Tools and Equipment
6. Source of Nauplii
7. Transportation of Nauplii
8. Acclimatization
9. Counting of Larvae
10. Stocking of Larvae

III. FEEDS AND FEEDING IN LARVAL REARING EXPERIMENT

In the larval rearing experiment, two species of phyto-plankton and Artemia nauplii were fed as live food for the larval growth and survival.

For the feeding in larval rearing tanks, the algal species of Tetraselmis chuii and Dun1liella salina were cultured previ-ously by the semi-continuous culture method. After stocking of larvae in larval rearing tanks, the initial feeding was in-troduced wtth Tetraselmis chuii and Dunaliella salina at the late stage of nauplius six (N6), the feeding was introduced with lo-25 x 10a cells per ml to the culture medium. During the culture period of protozoea stages one to three (21 to zt) ph}toplankton was fed twice a day and the feeding density of algae were gradually increased up to 20 - 30 x lOa cells per ml of each culture tanks. The desired amount of algal food to be fed in the larval rearing tanks are without previous feeding and with previous feeding.

IV. EXPERIMENT II FOR LARVAL REARING INDEX OF BLACK TIGER SHRIMP (Penaeus Monodon)

This experiment was conducted in 120 liters concrete tanks with 100 liters of culture medium. In each tank, the stocking rate was conducted with 25 pieces per liter and the stocking density was conducted 2500 pieces per tank.

Before the stocking of larvae, the prepared tanks were filled with 26 ppt salinity of disinfected seawater passed through a filter bag of 3 -5 micron mesh aperture.

Firstly, the culture tanks were filled with 60% of culture capacity of the tank and provided with continuous aeration. After stocking larvae the required amount of water were added daily until the desired capacity 100 liters. After five to six days of culture experiment, daily exchanged with 10-20% of culture medium from the concrete tank.

During the experiment, the feeds and feeding was con-ducted with three different types of organisms, phytoplank-tons (Tetraselmis chuii and Dunaliella salina) for early larval stages of zoea and zooplankton (Artemia nauplii) for late larval stages of mysis onwards as live food.

Tetraselmis chuii was fed in tank No. 3 and Dunaliella sqlinq was fed in tank No. 4 with the feeding density of 20-3 0 x 1 0a cells per ml. Feeding of Artemia nauplii was started at Mysis stage 1 (M1) with the feeding rate of 1-5 pieces per ml of culture medium. Feeding frequency of live food or-ganisms was conducted two times per day at morning and evening.

During the larval rearing experiment, the physico-chemical parameters of culture tanks were monitored daily and recorded. The survival, chronological growth stages and health of the larvae were checked daily by crude observa-tion and random samples examination at morning and evening. For good water quality, the rearing water were of-ten treated with chemicals such as EDTA, oxytetracycline and oxygen powder for buffering actlrty, prevention of gen-eral pathogens and higher concentration of dissolved oxy-gen.

After 16 days of culture experiment, the larvae of black tiger shrimp at post larval stages 6 and 7 (PL6t) were har-vested and counted by volume based estimation method. Then, the survival rates of post larvae from each culture tank were calculated.

V. EXPERIMENTAL RESULTS FOR LARVAL REARING INDEX OF BLACK TIGER SHRIMP (penaeus monodon)

In this experiment, the black tiger shrimp (Penaeus mon-odon) larvae at the nauplii stages N+-Ns from WINNER BROTHER Co., Ltd. were transported by car to the hatch-ery. After arrlal to the hatchery, acclimation of water tem-perature, water pH, water salinity were conducted for the stability of larvae in new environmental conditions. After acclimation, the larvae were stocked in the prepared larval rearing tanks and provided with conditions aeration.

For the lawal rearing experiment, there were conducted with two different stocking densities of 2500 pieces in each tank for experiment II. After 16 days of larval rearing ex-periments, the results were recorded as follows respectively.

a. Tank No. 3 (Experiment II)

In this experiment, stocking density of nauplii larvae were at the rate of 25 nauplii larvae per liter, with 2500 pieces of nauplii in 100 liter of natural seawater. The larvae were fed Tetroselntis chuii and Artentia nauplii. Nursery and larval rearing experiment was conducted for 16 days from the date of (2.1.2018) to (l8.1.2018). After larval rearing exper-iment 1320 pieces of 6-7 days old post larvae (PL6-7) were harvested. During the larval rearing experiment, the chrono-logical development of the metamorphosis growth stages, type of feed and feeding rate and survival rate were found as follows.

According to the data, the gradually decrease of survival rate was shown as 55.3%. It may be due to stocking density, feeding management and water quality. During 16 days of larval rearing experiment period, the water temperature in larval rearing tank was recorded as the minimum of 26°C and maximum of 29°C. The air temperature of culture room was 27°C to 35°C. The range of water pH in larval rearing tank was 8.2to 8.5 and salinity range was 28-30 ppt. The detail recorded data of water quality parameters were shown in Table 1 and Figures 1, 2 and 3.

Table 1. Type of feed and feeding rate and survival rate

Larval Stage	Larval Density(pcs)	Type of feeding and feeding rate		Tank 1
		Tetraselmis chuii(cell/ml)×10^4	Artemia nauplii (pcs/ml)	Survial rate %
N_4-N_5	2500	-	-	100.0
N_6-Z_1	2260	20	-	90.4
Z_1	2130	30	-	85.3
Z_1- Z_2	2030	30	-	81.2
Z_2- Z_3	1940	30	-	77.6
Z_3	1860	30	-	74.5
Z_3-M_1	1800	30	1	72.3
M_1-M_2	1750	25	1	70.0
M_2-M_3	1700	20	2-3	67.8
M_3-PL	1620	15	3-4	64.7
PL_{1-2}	1570	10	1-5	62.8
PL_{2-3}	1500	10	1-5	60.2
PL_{3-4}	1460	5	1-5	58.4
PL_{4-5}	1430	5	1-5	57.3
PL_{5-6}	1400	3	1-5	56.0
PL_{6-7}	1380	3	1-5	55.3

b. Tank No. 4 (Experiment II)

This experiment was conducted by the stocking rate of 25 nauplii per liter, totally with 2500 pieces of nauplii in 100 liter of natural seawater. After the

nursery and larval rearing experiment was conducted for 16 days from the date of (2.1.2003) to (18.1.2003), 1500 pieces of PL6-7 were har-vested. During the larval rearing experiment, the chronological development of the metamorphosis growth stages, type of feed and feeding rate and survival rate were found as follows.

According to the data, the gradually decrease of survival rate was shown as 60%. It may be due to stocking density, feeding management and water quality.

During the 16 days of larval rearing experiment period, the water temperature in larval rearing tank was recorded as the minimum of 25.5°C and maximum of 29°C.

The air temperature of culture room was 27°C to 35°C. The range of water pH in larval rearing tank was 8.2 to 8.5 and the salinity range was 28-30 ppt. The detail recorded data of water quality parameters were shown in Table 2 and Figures 1, 2 and 3.

Table 2.Type of feed and feeding rate and survival rate

Larval Stage	Larval Density(pcs)	Type of feeding and feeding rate		Tank 2
		Tetraselmis chuii (cell/ml)× 10^4	Artemia nauplii (pcs/ml)	Survial rate%
N_4-N_5	2500	-	-	100.0
N_6-Z_1	2330	20	-	93.3
Z_1	2260	30	-	90.4
Z_1- Z_2	2150	30	-	86.2
Z_2- Z_3	2070	30	-	84.5
Z_3	2100	30	-	82.3
Z_3-M_1	1950	30	-	77.9
M_1-M_2	1860	25	1	74.6
M_2-M_3	1800	20	1	72.5
M_3-PL	1950	15	2-3	70.0
PL_{1-2}	1690	10	3-4	67.6
PL_{2-3}	1640	10	1-5	65.7
PL_{3-4}	1580	5	1-5	63.5
PL_{4-5}	1540	5	1-5	62.0
PL_{5-6}	1520	3	1-5	60.8
PL_{6-7}	1500	3	1-5	60.0

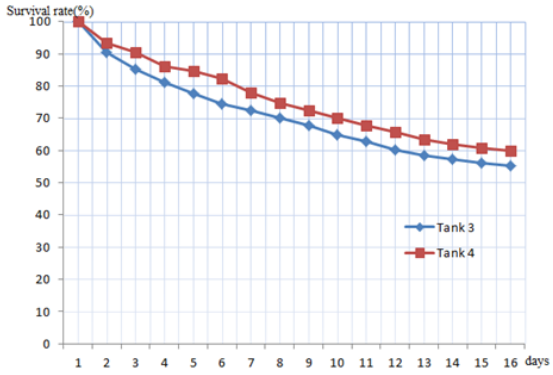

Fig.1. Culture period (day) Survial rate % Penaeus monodon Larvae in Culture Tanks

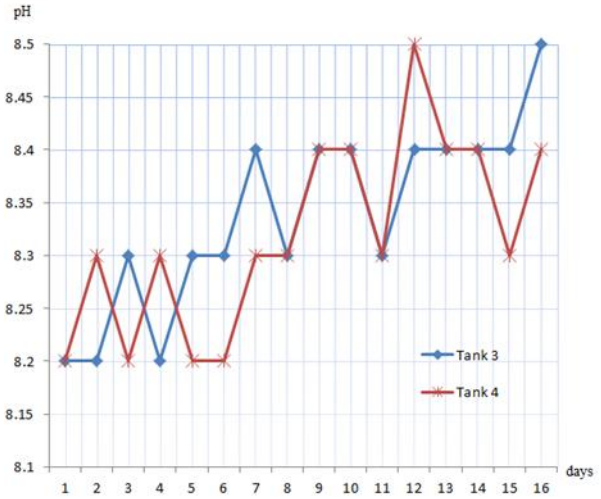

Fig.2 Culture period (day) & Water pH Penaeus monodon Larvae in Culture Tanks

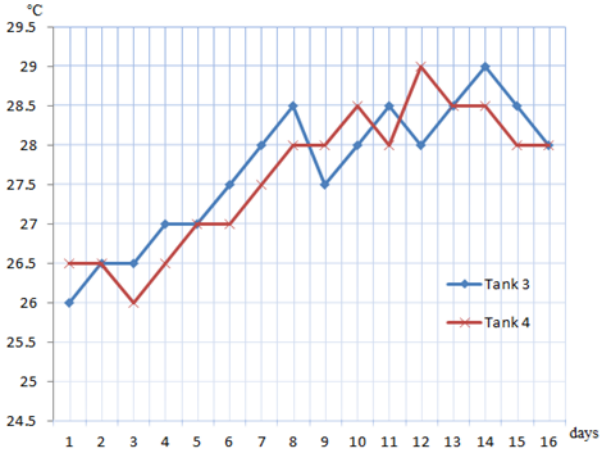

Fig.3. Culture period (day) & Temperature (°C) Penaeus monodon Larvae in Culture Tanks

VI. CONCLUSION

After the larval rearing experiments, the results of the sur-vival rate were shown respectively. For the experiment II with the stocking density of 2500 pieces, the results of the survival rates were obtained as 55.3% fed with Tetraselmis chuii and 60% fed with Dtrnaliella salina respectively. Based on the results of the respective experiments, the high-er in survival rates of post larvae were found in the rearing tanks, those fed with Dunaliello salina than that of the tanks. those fed wrth Tetraselmis chuii. From the results and information of respective experiments, there may be con-firmed that Dunaliella salina are more suitable for the utili-zation in black tiger shrimp larvae than that of Tetraselntis chuii in terms of higher in survival rates.

From the results, there were found that the higher survival rates in experiment II with 2500 pieces stocking density, may be due to the stocking densities dependent. Hence there may be confirmed that the lower in survival rates of black tiger shrimp larvae. Finally there may be concluded that the successful results of the technology know-how in larviculture of black tiger shrimp were achieved. From the results and information, it may be suggested that the possi-ble role and feasibility of Dunaliella salina and Tetraselmis chuii for utilization as larval feeds in larviculture of black tieer shrimn (Peneetts monodon).

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