Research Article

Culture of *Litopenaeus vannamei* of Brackish Water in Summer Season with Artificial Diet

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ABSTRACT

The Pacific white shrimp is an Ecological important and Euryhaline species. The culture was conducted from 3 ponds each one of 0.7ha for the study. The Brackish water was selected in Chinaganjam Village, Prakasam District under Semi-Intesive culture system. In summer season in month of March to August, the water quality parameters were measured fortnightly in a month at 7a.m. The production was 8337, 8932 and 9450kg/120, 123 and 126 days and FCR was1.78, 1.81 and 1.82 for P1, P2 and P3. The artificial diet was provided 4 times/day with Manamei feed pellets (Protein 35 and 34%).The final growth was 27.7, 29.0 and 30.0g/120,123 and 126 days, respectively.

Key words: *L. vannamei*, Temperature, Salinity, Density, Feed, Growth and Production.

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INTRODUCTION

L. vannamei (Boone, 1931) is the most important penaeid shrimp species farmed worldwide (Alcivar – Warren *et al.* 2007).[1] Because of the high demand for shrimps in Japan, the United States and Europe, shrimp aquaculture has expanded rapidly in all around the world, especially in tropical areas, such as Southeast Asia and Latin America (Lombardi *et al.* 2006).[2] Among all species of shrimp, *L. vannamei,* which represents over 90% of shrimp culture in the Western hemisphere, is the most commonly cultured shrimp in Central and South American countries, China and Thailand (Frias-Espericueta *et al.* 2001; Mc Graw *et al.* 2002; Saoud *et al.* 2003).[3-5]

MATERIALS AND METHODS

All ponds were pumped with creek water. The pond shape is rectangular. The post larvae PL_{15} of *L. vannamei* was 15 days old for beginning of the study. The PL_{15} collected from BMR hatchery (Iscapalli village) situated about 30 km of Nellore District in Andhra Pradesh. Cost of seed is 50 paisa for each. Water depth maintained 8ft. In the summer season, *L.vannamei* (PL) stocking densities were taken for culture in three ponds, each one contains (3, 50,000) 50species/m^2 and also, survival was 86, 88 and 90% (3,01,000; 3,08000; 3,15000), respectively. The temperature, salinity and DO ranges up to 33°C, 14ppt and 4.1ppm/day. The artificial feed was given by Manamei feed pellet (Protein% 35 (Feed No. 1, 2, 3 and 3S) and Protein% 34 (Feed No. 3M)). Cost of the feed Rs.71.84/kg. The methodology includes standard techniques to measure the water quality parameters.

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RESULTS

The stocking density was influenced by the water quality parameters (Table 1) and also, indicated the reduction of survival rate at higher densities. The species *L. vannamei* was well grown up to 20 gm body weight from 3.75g to 4.25g/15 days in Indian climate conditions, which is better than other countries. In the culture system the growth rate increased due to the artificial feed supplementation in the summer season. The oxygen consumption was higher in the large species than the small species. More feed is given more Ammonia released. When the electrical aerators and probiotics are used, the shrimp growth rate was increased due to lack

of Dissolved Oxygen (DO). The shrimp culture of the mean average weights of the shrimp were 27.7, 29.0 and 30.0g (Tables 1-3). The given feed 4662, 4932.3, 5181.6 kg/ 120, 123, 126 days; FCR was 1.78, 1.81 and 1.82 for P1, P2 and P3 (Table 1); production was 8337, 8932 and 9450 kg, respectively. Cost of the species at harvesting time Rs.400/kg.

DISCUSSION

The shrimp maintained at 35°C had the highest rate of food consumption (Araneda *et al.* 2008)[6] recorded the average growth rate of 0.38 g/wk in the 90 shrimp/ m2 and lowest in the180 shrimp/m2 (0.33 g/wk). Despite the growth variation observed, all values of the parameters meet the water quality requirements for shrimp production (Cawthorne, Beard, Devenport and

Table 1: P1 Water parameters & Growth performance.

DOC	Temperature (°c)	Salinity (ppt)	DO (ppm)	Giving Feed (%)	Fortnightly Growth (gm)	Total Growth (gm)
15	28.5	10.0	3.4	-	2.00	2.00
30	30.5	11.5	3.6	7.0	3.00	5.00
45	31.5	12.5	3.8	5.5	4.35	9.35
60	32.0	13.0	3.9	4.5	4.15	13.50
75	33.0	14.0	4.1	3.8	4.25	17.75
90	32.5	13.5	4.0	3.2	4.15	21.90
105	31.0	12.0	3.7	2.9	3.00	24.90
120	29.0	11.0	3.5	2.1	2.87	27.77

Table 3: P3 Water parameters & Growth performance.

DOC	Temperature (°c)	Salinity (ppt)	DO (ppm)	Giving Feed (%)	AVG Fortnightly (gm)	Total Growth (gm)
15	30.5	11.5	3.6	-	2.00	2.00
30	29.0	10.0	3.4	7.0	3.50	5.50
45	30.0	11.0	3.5	5.5	3.50	9.00
60	31.0	12.0	3.7	4.5	5.00	14.00
75	33.0	14.0	4.1	3.8	5.00	19.00
90	32.5	13.5	4.0	3.2	4.00	23.00
105	30.0	11.0	3.5	2.9	3.50	26.50
126	29.0	10.0	3.4	2.1	2.50	30.00

Table 2: P2 Water parameters & Growth performance.

DOC	Temperature (°c)	Salinity (ppt)	DO (ppm)	Giving Feed (%)	AVG Fortnightly (gm)	Total Growth (gm)
15	28.0	10.0	3.4	-	2.00	2.00
30	29.0	11.0	3.5	7.0	3.35	5.35
45	30.5	12.5	3.8	5.5	3.65	9.00
60	31.0	13.0	3.9	4.5	5.00	14.00
75	33.0	14.0	4.1	3.8	5.00	19.00
90	32.5	13.5	4.0	3.2	4.00	23.00
105	30.0	12.0	3.7	2.9	3.00	26.00
123	28.0	10.0	3.4	2.1	3.00	29.00

Table 4: Average cost analysis.

Details	Pond1	Pond2	Pond3
Area (ha)	0.7	0.7	0.7
DOC	120	123	126
Stocking date	27/03/2013	27/03/2013	27/03/2013
Harvest Date	27/06/2013	30/06/2013	03/06/2013
Density (m2)	50	50	50
PL size	PL15	PL15	PL15
Final Growth	27.77	29.00	30.00
AVG	3.47	3.62	3.75
Count (numbers/kg)	47	45	44
Survival (%)	86	88	90
FCR	1.78	1.81	1.82
ADG (gm)	0.23	0.23	0.23
Total Feed (kg)	4662	4932.3	5181.6
Production (kg)	8337	8932	9450
Seed cost/Rs	0.50	0.50	0.50
Feed cost/kg/Rs	71.84	71.84	71.84
Production cost/kg/Rs	400	430	460
Expenditure cost/kg/Rs	181.65	186.37	187.34
Profit/kg/Rs	218.34	243.63	272.66

Wickins,1983; Allan and Maguire, 1991; Garcia and Brune, 1991; Lee and Wickins, 1992; Prado-Estepa, Llobrera,Villaluz and Saldes, 1993).[7-11] It is noteworthy that optimum growth is between 3-14 ppt which is little less than (Bray *et al.* observations (1994), but far more than Huang, (1983), Zu *et al.* (2004)[12-14] observations.

As one of key factors for culture shrimp, water quality not only affects the shrimp growth and survival rate, but also affects the accuracy of the experiment result (Chim *et al.* 2008).[15] During the course of the attachment, a large number of shrimp could be assembled on the pond bottom from the artificial substrates (Zhang *et al.* 2010).[16] Abiotic factors such as temperature and salinity may also affect the protein requirement (Guillaume, 1997).[17] "Vibro cheak" for controlling of Vibrio. "Min Grow" for replacing the deficiency of minerals. "Bactericide" for controlling of Black gill disease. Potash 25kg/0.7/ha for control the body gram of species. P1 the survival rate was decreased comparatively with P2, P3 and P1 FCR was low compared with P2, P3 (Table 1) and P3 the growth was increased in P1, P2 (Table 2-4). The mean feed and average growth were 66.1, 67.2 and 68.1 and 3.47, 3.62 and 3.75 for P1, P2 and P3 (Table 2-4).

CONCLUSION

In the present study, it has been observed, Temperature, Salinity, DO, Density and Survival have been observed and the shrimp growth rate and Production were increased with artificial feed.

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

ABBREVIATIONS

***L. vennamei*:** *Leptopenaeus vennamei*; **DO:** Dissolved Oxygen; **FCR:** Food conversion ratio; **PL:** Post Larvae.

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