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# Growth of cultured *Litopenaeus vannamei* (Boone, 1931) of Brackish water culture system in rainy season with artificial diet

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# ABSTRACT

The Litopenaeus vannamei culture was conducted from three ponds each one of 0.6 ha for the study. Semi-Intensive culture system was selected under brackish water conditions. Stocking densities (post larvae) were taken from 3samples; each one contains 60 Numbers/m<sup>2</sup>. In winter season in month of June to September, the water quality parameters were measured fortnightly in a month at 7a. m. The production was 6248, 6633 and 6945kg and FCR was2.44, 1.60 and 1.71 and the final growth was 21.2,22.2 and 22.7g/104,110 and 112 days for P1, P2 and P3, respectively.

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

## **INTRODUCTION**

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). Among all species of shrimp, *L. vannamei*, which represent 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;). *Litopenaeus vannamei* is generally considered to be more disease resistant than other shrimp (Wyban and Sweeny 1991). It has been cultured in coastal waters ranging in salinity from 1 to 40 ppt (Bray et al. 1994).India has the one of the longest coastal line of 8118 km.

## MATERIALS AND METHODS

The shrimp 15 days old post larvae collected from BMR hatcheryat beginning of the study. The winter season experiments the species *L. vannamei* survival were 84, 86 and 88%, respectively. Water depth maintained 7ft. The water takes from creek pumped to 3ponds by PVC pipe (size  $2\frac{1}{2}$  inch). The P<sup>H</sup>, temperature, salinity and DO ranges up to 7.7–8.2, 16.5–20.0<sup>o</sup>C, 11.0–14.5ppt and 3.5–3.9ppm/day for P1, P2 and P3. The artificial diet was given made by Manamei feed (protein 35% (Feed No. 1, 2, 3 and 3S) and 34% (Feed No. 3M)).

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#### **RESULTS AND DISCUSSION**

In the experiment the water quality parameters are presented (Table 1). The species *L. vannamei* well grow, the body weight increased 2.0-4.5gand ADG 0.20g (P1, P2 and P3)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 season. The mean average weights of the shrimp at harvest were 21.2, 22.2 and 22.7g (Table2, 3 and 4) and production was6248, 6633 and 6945kg and FCR was 1.44, 1.60 and 1.71/104, 110 and 112days for P1, P2 and P3, respectively.

ter quality parameters

Parameters	Pond 1 range	Pond 2 range	Pond 3 range
P <sup>H</sup>	7.7-8.2	7.7-8.1	7.8-8.2
Temperature ( <sup>0</sup> C)	17.0-18.0	16.5-18.5	18.5-20.0
Salinity (ppt)	11.0-12.0	11.0-12.5	12.0-14.0
DO (ppm)	3.5-3.6	3.5-3.8	3.6-3.9

Pond	Days of culture (DOC)							
	15	30	45	60	75	90	104	
P1	2.00	5.00	8.00	11.00	14 50	18.00	21.20	

Table 2: Fortnightly growth performance (g)

Table 3: Fortnightly growth performance (g)

Pond	Days of culture (DOC)						
	15	30	45	60	75	90	110
P2	2.00	6.00	9.00	12.00	15.50	19.00	22.20

#### Table 4: Fortnightly growth performance (g)

Pond	Days of culture (DOC)						
	15	30	45	60	75	90	112
P2	2.00	6.50	9.50	12.50	15.50	19.50	22.70

A large number of shrimp could be assembled on the aquaria bottom from the artificial substrates (Zhang *et al.*, 2010). Many studies have illustrated that artificial substrates could increase shrimp growth and survival (Moss and Moss, 2004; Arnold *et al.*, 2009). Abiotic factors such as temperature and salinity may also affect the protein requirement (Guillaume, 1997). "Booster" mineral is given to 3ponds depending on biomass for development the minerals. "Opti oxygen" controls the DO. "AQ lite" for bottom clears. The shrimp maintained at  $35^{0}$ C had the highest rate of food consumption Arenda *et al.*, 2008) recorded the average growth rate of 0.38 g/wk in the 90 shrimp/m<sup>2</sup> and lowest in the 180 shrimp/m<sup>2</sup> (0.33 g/wk). My observation at 7-8.2<sup>o</sup>C the shrimp highest growth rate 4.5g and lowest growth 3.0g/fortnightly (60 shrimp/m<sup>2</sup>) /104 and 112 days. Early morning Dissolved Oxygen concentration was between 3 and 5 mg1-1; salinity was above 15 % during the first week of grow out pond, which is preferable for post larvae. Cawthorne, Beard, Devenport and Wickins1983; Allan and Maguire 1991; Garcia and Brune 1991; Lee & Wickins 1992; Prado-Estepa, Llobrera, Villaluz & Saldes 1993). In early morning I reported Dissolved Oxygen concentration was between 3.4-4.2 ppm and salinity was between 6-12.5ppt.

For each pond cost analysis was worked out. Production cost for 1kg shrimp (47, 45 and 44 counts) was calculated as Rs530, 570 and 630. The feed cost was Rs 71.84/kg followed by seed cost Rs 20.50/kg. Totally feed was used 3806, 4132 and 4058.6kg. According to Danya Babu. Ravuru and Jagadish Naik. Mude in summer season production (kg) was better than the rainy season 8337, 8932 and 9450/P1, P2 and P3 for 120, 123 and 126days and 6248, 6633 and 6945kg/P1, P2 and P3 for 104, 110 and 112days.But in rainy season profit (Rs/kg) was better compared with summer season 336.16, 372.04 and 431.83/ P1, P2 and P3 for 104, 110 and 112days and 218.34, 243.63 and 272.66/P1, P2 and P3 for 120, 123 and 126 days(Table 5).

Details	Pond 1	Pond 2	Pond 3
Area (ha)	0.6	0.6	0.6
Initial stocking (numbers)	3,60,000	3,60,000	3,60,000
Density (numbers/m <sup>2</sup> )	60	60	60
Stocking Date	05/06/2013	05/06/2013	05/06/2013
PL stocking (days)	PL <sub>15</sub>	PL15	PL <sub>15</sub>
Harvest Date	19/09/2013	25/09/2013	27/09/2013
Harvest size (g)	21.20	22.20	22.70
Count (numbers/kg)	47	45	44
Doc	104	110	112
Survival (%)	84	86	88
FCR	1.44	1.60	1.71
ADG (g)	0.20	0.20	0.20
Production (kg)	6248	6633	6945
Total feed (kg)	3806	4132	4058.6
Seed cost/kg shrimp	Rs 20.50	Rs 20.50	Rs 20.50
Feed cost/kg	Rs71.84	Rs71.84	Rs71.84
Pond preparation cost/kg	Rs 5.00	Rs 5.00	Rs 5.00
Water treatment cost/ kg	Rs 7.00	Rs 7.50	Rs 7.60
Probiotic cost/ kg	Rs 4.00	Rs 4.50	Rs 4.60
Minerals cost /kg	Rs 4.00	Rs 4.40	Rs 4.50
Diesel cost/kg	Rs 8.00	Rs 9.00	Rs 9.10
Electricity cost/kg	Rs 25.00	Rs 25.50	Rs 25.60
Labour cost/kg	Rs 4.99	Rs 5.21	Rs 4.83
Other expenses (include maintenance & repair)/kg	Rs 43.50	Rs 44.50	Rs 44.60
production cost/kg of shrimp	Rs 530	Rs 570	Rs 630
Expenditure cost/kg Shrimp	Rs 193.83	Rs 197.95	Rs 198.17
Profit/kg	336.16	372.04	431.83
Total profit (Rs)	21,00,390	24, 67, 807	29, 99, 060

Table 5: Average Cost Analysis

### CONCLUSION

In the present study, it has been observed, Temperature, Salinity, Dissolved Oxygen, Density and Survival. The shrimp *L. vannamei* culture is successful in brackish water and shrimp growth was increased with artificial feed.

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