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Growth and production of pacific white shrimp *Litopenaeus vannamei* (Boone, 1931) with different stocking densities in semi-intensive brackishwater liner ponds, Chennai, India: Technical report

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Abstract

Pacific white shrimp (*Penaeus vannamei*) is one of the main fishery products in fisheries sector. It has suitable for farming, stable production, easy to stocking high density, and highly diseases resistance. Most of the farmers in India choose to cultivate vannamei shrimp. Moreover, there are still other advantages of vannamei shrimp, its euryhaline species. No proper research yet been recorded on the effect of stocking density in survival rate and growth performance of *L. vannamei*. The aim of this report was to evaluate the growth, survival, and production performance of white shrimp (*P. vannamei*) in brackishwater liner ponds at different stocking densities.

Keywords: Stocking densities, pacific white shrimp, Brackishwater, semi intensive system

Introduction

Brackishwater aquaculture is one of the fastest-growing food sectors in the world. The faster growth rate of shrimps, minimum culture period, more export value and always demand in the market. In the recent years aquaculture intensification has become a common practice throughout the world. Farmers are reporting with higher stocking densities, artificial fertilization of the ponds and supplementary feeding using artificial feeds to get the maximum profit from a unit area. Pacific white shrimp is most cultivated shrimps all over the world (Perez Farfante and Kensley 1997) [8] and favorable environmental conditions (Zhu *et al.*, 2006) [15]. Many authors are detailed about growth of shrimp culture systems based on stocking density (Cailout *et al.*, 1976; Sedgwick 1979; Maguire and Leedow 1983) [3, 11, 7] and reported the similar of several authors about the inverse relationship between the stocking density and growth (Lee *et al.*, 1986; Sandifer *et al.*, 1987; Whay-Ming and Yew-Hu, 1992; Daniels *et al.*, 1995) [6, 10, 13].

The objective of this study was to evaluate the effect of stocking density and growth performance in the white shrimp *Litopenaeus vannamei* in the liner ponds and culture period was 120 days. The present study is carried out at Brackishwater Research Farm Facility (BRFF) Vaniyanchavadi, Chennai, India. During the stocking density of *L. vannamei* post larvae with an initial weight of 0.9 g were cultured for 120 days at a stocking density of 38, 100, and 135 shrimp/m² and three liner ponds measured at 230, 323 and 333 m² in respectively.

Discussion

After the 120 days period reached the production was 153 kg, 202 kg and 112 kg, and survival rate was 70%, 39% and 19% and average body weight was 20 g, 16 g and 13 g, respectively. Allan and Maguire (1992) [1] reported that higher stocking densities of shrimp it's indicating of slow growth. Kungvankij and Chua, (1986) [5] and Tidwell *et al.*, (1999) [12] also stated that best economic results were possible at optimum stocking density and that may depend upon the area of the pond. They also stated that in culture system different stocking densities will be used for different shrimp species. Roethlisberg (1998) [9] stated that increasing density and shrimp biomass had negative effect on growth. In the present study also it was clearly indicated that at 100 pcs/m² of stocking density the yield was decreased compared to the 135 pcs/m².

Survival rate of growing *L. vannamei* were 70%, 39% and 19% with respect to the densities 38/m, 100/m, and 135/m² respectively. The present study showed that, the survival rate and average body weight also increased in low stocking densities of 30/m² pond. The survival rate decreased with the increasing stocking densities of pond. Wyban *et al.*, (1987) ^[14] stated the suitable stocking densities for *L. vannamei* were 5 to 21 pcs/m² and Sandifer *et al.*, (1987) ^[10] stated it was 10 to 40 pcs/m² for *P. monodon*.

Conclusion

The end result, Survival and Average body weight is higher in low stocking density of pond no:P1 than the other 2 ponds which are stocked at higher densities and also pond No.P1 is more profitable than other ponds due to higher market price for 50 count harvested shrimps. In the present study, it was concluded that, stocking density need to be fixed primarily based on the carrying capacity of each pond, based on that the Growth and production of shrimps will be achieved.

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