

A Note on Monoculture of *Penaeus monodon* in a Hardwater Seasonal Pond

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Abstract

A study was undertaken to assess the growth performance of brackishwater tiger shrimp, *Penaeus monodon* under monoculture in a hardwater seasonal pond in Tamil Nadu, India. A production of 209 kg/ha/110 days was attained at a low stocking density of 1.5/m².

Introduction

In recent years, appreciable developments have been made in aquaculture of shrimps all over the world. Different ranges of salinity have been reported to support the survival and better growth of *P. monodon* (Muthu 1980; Rajyalakshmi 1980; Chen 1984; Chanratchakool et al. 1994; Karthikeyan 1994). A high rate of survival and good growth of *P. monodon* in a freshwater lake has been reported from the Philippines (Pantastico 1979). Monoculture of *P. monodon* in rivers, irrigation channels and ground water has been successfully accomplished in Thailand (Raghunath et al. 1997). However, there is little information available on monoculture of *P. monodon* in hardwater seasonal ponds. Hence the present study was undertaken to assess the growth and culture potential of *P. monodon* in hardwater seasonal ponds under monoculture in Tamil Nadu, India.

Materials and Methods

Shrimp seeds (PL₃₅) procured from a local shrimp hatchery were kept in aerated brackishwater of the same salinity (23 ppt) as in the hatchery for 6 hrs in a tank. Crumble

feed was given daily at the rate of 10% of body weight in the ensuing days without changing the salinity of the water. Later, the salinity of the water was reduced gradually at the rate of 5 ppt/week. It took 16 days to acclimatize the shrimp seed from the brackishwater to freshwater. After acclimatization to freshwater conditions the seed were stocked in a hardwater fishpond of 0.1 ha area at a density of 15 000/ha. The shrimp seed were fed with dry pelleted feed containing 40% protein at the rate of 12%, 8%, 5%, 4.5%, 4.0%, 3.5%, 3.0%, 2.5% and 2.0% of biomass to day 37, 52, 59, 73, 80, 87, 94, 101 and 110 of culture, respectively. Once every 10 days, sampling was done using a cast net and the growth was recorded. Harvesting was done initially by netting and finally by hand picking after removing excess water.

Results and Discussion

The mean values of the different water quality parameters along with standard deviations are presented in Table 1. In the present investigation, *P. monodon* exhibited a growth rate of 0.13 cm and 0.218 g/day and attained an average size of 14.5 cm and 25 g at the end of the culture experiment (110 days) with 58% survival. Feed conversion rate was 2.43. Raghunath et al. (1997) reported that although farmers in inland areas of Thailand undertaking monoculture of *P. monodon* occasionally achieve yields of 6-8 t/ha/crop under ideal conditions, yields of 3-4 t/ha/crop are common at the intensive stocking densities of 30-40/m². Guru et al. (1993) observed a growth of 26.30 g after 135 days of culture at a density of 3/m² and a

Table 1. Mean values with standard deviation of water quality parameters recorded during the culture operation.

Parameters	Values
Water level (m)	1.06 ± 0.08
Temperature (°C)	31.58 ± 1.21
pH	8.04 ± 0.07
Secchi depth (cm)	29.40 ± 1.37
Dissolved oxygen (mg/l)	4.88 ± 0.89
NH ₃ (ppm)	0.022 ± 0.0047
Hardness (ppm)	786.25 ± 232.67

salinity range of 4-10.8 ppt. Saha et al. (1999) reported growth of 28.43-28.64 g in 35 days when grown at a low salinity of 0.16 to 6.52 ppt. In the present study, the very low stocking density of 1.5/m² resulted in extrapolated shrimp production of 208.8 kg/ha/110 days.

Farmers of Thailand encounter severe disease problems in shrimp culture due to bacteria and viruses. Similar disease problems are prevalent in the shrimp ponds of India. To overcome these problems, alternate culture cycles with tilapia have been suggested (Raghunath et al. 1997). The monoculture of shrimp in hardwater would be another method to combat disease problems. In hardwater, natural pathogenic bacteria and viruses do not thrive well. Since many inland areas of India are known for their hardwater resources, it can be concluded that culture of *P. monodon* in hardwater could be a successful venture when compared to the traditional carp culture practice.

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