

THE CULTURE OF FRESHWATER PRAWN, *MACROBRACHIUM ROSENBERGII* IN KHARLAND (SALINE) PONDS OF RATNAGIRI, MAHARASHTRA

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The coastal saline soils locally called as 'Kharland', though unsuitable for agriculture can be utilized for the culture of prawns and fishes. The Kharland ponds were prepared for the culture by applying lime, cattle dung, urea and single super phosphates in appropriate doses to create suitable environment for culture. The prawn culture was done in two rectangular ponds with an area of 450 m² (0.045 ha) each. Post-larvae of *Macrobrachium rosenbergii* were stocked @ 50,000 per hectare. The initial average size and weight of post-larvae stocked were 11.00±3.04 mm and 13.0±5.1 mg in pond P1, and 11.00±3.14 mm and 13.00±8.12 mg in pond P2. The prawns were fed with laboratory prepared feed @ 10% of the biomass every day. After a period of four months the prawn grew up to 88.0±6.5 mm and 2169.0±3.08 mg in pond P1 and 85.0±4.2 mm and 1980.0±9.8 mg in pond P2. The study suggested possible utilization of Kharland ponds for culture.

INTRODUCTION

About 65,465 hectares of Kharlands are available in Thane, Raigad, Ratnagiri and Sindhudurg coastal districts of Maharashtra, which possess potential for aquaculture. Working under different ago-ecological condition, Sidthimunka and Choapaknam (1968), Provenzano (1973), Adrill and Thompson (1975) and Sandifer and Smith (1976) have reported varying degrees of success during the culture of freshwater prawn, *Macrobrachium rosenbergii*. Shirgur *et al.* (1986) reported good growth of *M. rosenbergii* and a moderate growth of *Penaeus monodon* in Kharland ponds. In spite of the availability of large potential of such area, lack of appropriate technology with desired survival and yield has hindered its effective utilization. As the production of aquaculture crops from these areas would require suitable species and culture technology, the present study was an attempt to utilize the Kharland ponds of Ratnagiri through culture of *M. rosenbergii*.

MATERIAL AND METHODS

The Kharland ponds under study are located within the campus of the College of Fisheries, Ratnagiri (Lat. 16°59'10" N and Long. 73°16'25" E), Maharashtra, India. Each pond is of 0.045 hectare in size (30 m x 15 m) and depth of 1.5 meter. These are tide fed ponds and connected with the Shirgaon creek of Ratnagiri district. The study was carried out for four months i.e., between 29 August, 2001 to 29 December, 2001. After draining out the pond water to a maximum extent, a uniform spreading of quick lime (CaO) was done initially @ 100 kg/ha and same doses were applied at monthly intervals. After five days of liming, manuring was done with cattle dung @ 1000 kg/ha, urea @ 50 kg/ha and single super phosphate @ 30 kg/ha, and the same dose of manuring was also followed at monthly intervals. Post-larvae of *M. rosenbergii* were stocked in each pond @ 50,000 nos/ha.

The post-larvae and prawns were fed with a practical diet containing protein 36%, carbohydrate 30%, lipid 12%, moisture 13% and ash 9%. The feed was prepared in the laboratory by mixing groundnut oil cake, rice bran, wheat bran, prawn meal, fish meal and vitamin-B tablets. The feed was broadcasted above the pond in two installments, one-fourth in the morning and three-fourth in the evening @ 10% of the body weight during rearing period. Leaves of palm trees were kept in the ponds for providing shelter and facilitating periphyton growth. Sampling of prawns was done once in a month by using a cast net and the length and weight of prawns were recorded for a period of four months. The water samples were also collected and analyzed for temperature, pH, dissolved oxygen, free carbon dioxide, total alkalinity and salinity following standard methods (APHA, 1986).

RESULTS AND DISCUSSION

Among the physico-chemical characteristics of ponds, the temperature ranged from 28.0 to 31.0°C, pH from 6.85 to 7.35, dissolved oxygen ranged from 2.4 to 4.0 mg/l, free carbon dioxide from 8.0 to 16.0 mg/l, total alkalinity 18.0 to 32.0 mg/l and salinity fluctuated from 4.7 to 32.0‰ in both ponds during the period of study. Detail accounts of the water quality, soil characteristics and primary productivity of such Kharland ponds have also been reported by Saksena *et al.* (2006), Gaidhane and Saksena (2007) and Gaidhane *et al.* (2007).

The growth data indicates that the prawn had attained an average final length of 88.0±6.5 mm and 85.0±4.2 mm in ponds P1 and P2 respectively after a period of four months (Table 1). The average final weight of prawn was 2168±3.08 mg and 1980±9.8 mg in ponds P1 and P2 respectively. The specific growth rate (% per day) recorded in the corresponding ponds were 4.26 and 4.18. The pattern of growth in two ponds has been

quite similar to each other. The growth rate during the initial 60 days was found to be quite impressive, which however, was found to reduce with the progress of the culture period, reaching to a minimum level in the last phase.

Table 1. Growth increment of *M. rosenbergii* reared in Kharland ponds

Days	Pond 1		Pond 2	
	Length (mm)	Weight (mg)	Length (mm)	Weight (mg)
Stocking	11.0±3.0	13.0±5.1	11.0±3.1	13.0±8.1
30 days	36.0± 2.7	450.0±5.7	50.0±5.7	580.0±7.8
60 days	65.0±4.3	1500.0±8.8	70.0±6.4	1310.0±10.3
90 days	80.0±1.2	2100.0±6.8	78.0±2.8	1895.0±4.6
120 days	88.0±6.5	2168.0± 3.1	85.0± 4.2	1980.0±9.8

Venugopalan (1988) has reported that *M. rosenbergii* can tolerate salinity up to 28‰. The species was also found to exhibit impressive growth rate in both freshwater as well as brackishwater (Wickins, 1972; Goodwin and Hanson, 1975; Perdue and Nakamura, 1976; Venugopalan, 1988), although Popper and Davidson (1982) obtained best growth in salinity range of 10-15‰. During the period of present investigation, there was a moderate but increasing rate of growth of prawns in both the ponds. These environmental factors could not be stabilized in the ponds to favour the growth of planktonic organisms since they were newly constructed and the salinity was on the higher side, i.e., up to 32‰ during the month of December. The present study indicated that the growth rate of 0.018 g in pond P1 and 0.016 g in pond P2 was registered per day in 120 days. It is also indicated that the weight gain decreased with the increase in salinity. The weight gain has shown a positive relationship with the salinity up to 28‰ but afterwards a negative correlation was evident. Our study has confirmed the observations of Venugopalan and Thampy (1992).

Kurup (2004) conducted studies on the technical feasibility and economic viability of farming of *M. rosenbergii* in the *pokkali* shrimp farms of Kerala and found encouraging results. His study has shown the potential of utilizing the *pokkali* field for effective culture of scampi. In the present study, a better growth of *M. rosenbergii* was recorded during 60 days of culture when the salinity was up to 18‰. Thus, along with other physico-chemical factors of water, *M. rosenbergii* farming activities depend on the salinity of the pond as observed by Smith *et al.* (1983). Maximum growth of any organism occurs at its iso-osmotic point, since the minimum energy is expended in osmoregulation at this juncture. The iso-osmotic point of *M. rosenbergii* is reported to be at about 17-18‰ (Sandifer *et al.*, 1975; Singh, 1977, 1980), but the maximum growth could never be recorded at this salinity level (Wickins, 1972; Goodwin and Hanson, 1975; Perdue and Nakamura, 1976). Popper and Davidson (1982) have reported better growth rate of *M.*

rosenbergii at 10-15‰ salinity. Venugopalan and Thampy (1992) found a growth rate of 0.063 g in 100 days at salinity ranging from 2.1 to 20.4‰. The average growth rate of about 18 mg per day in the present study, suggest the feasibility of use of Kharland ponds for freshwater prawn culture.

The Kharland ponds are unique in physico-chemical characteristics during their seasonal cycle. From the month of July to October the water in these ponds is nearly freshwater with low salinity of <15‰ and hence during this period the pond culture of *M. rosenbergii* can be taken up. Considering the increase in salinity of these water bodies from the month of November till May, the possibility of culture of brackishwater prawns need to be explored.

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