

**COMPARATIVE EVALUATION OF PERFORMANCE
OF FRESHWATER PRAWN, *Macrobrachium rosenbergii*
(De Man) IN DIFFERENT AQUACULTURE SYSTEMS
IN SRI LANKA**

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ABSTRACT

At present, there is a considerable commercial demand for freshwater prawn (*Macrobrachium rosenbergii*) in Sri Lanka. National Aquaculture Development Authority of Sri Lanka operates two *M. rosenbergii* hatcheries which have the capacity of producing 18 million postlarvae per year.

The present study was carried out to evaluate performance of culture of *M. rosenbergii* in various aquaculture systems with a view to optimizing utilization of freshwater prawn postlarvae in sustainable aquaculture. This study was carried in different aquaculture systems namely monoculture in six earthen ponds, polyculture with carps, GIFT strain of *Oreochromis niloticus* and red tilapia in six earthen ponds, culture based fisheries (CBF) in five seasonal reservoirs and three types of perennial reservoirs (i.e. major, medium and minor perennial reservoirs). Performance of *M. rosenbergii* in three aquaculture system was evaluated based on the survival rates, specific growth rate (SGR) and stocking efficiency. CBF trials in major, medium and minor perennial reservoirs were also evaluated using stocking density, harvests and net economic returns.

Climate change impacts on hatchery production and aquaculture of *M. rosenbergii*, carps and tilapia were also investigated. Monthly rainfall influence on production of carp postlarvae, tilapia fry and freshwater prawn postlarvae in the hatcheries was investigated employing non-parametric time-lag correlation. Similarly effect of temperature on postlarvae/fry production was also investigated. Thirty one seasonal reservoirs from five districts of Sri Lanka were selected to investigate climate change impact on CBF. The impact of shift of monsoonal rains on the CBF crop calendar was investigated using HEC-HMS hydrological model. The relationship between the percentage water availability and CBF yield was determined to quantify the minimum amount of water required for CBF.

The yields of the freshwater prawn were very low in seasonal reservoirs. In polyculture pond systems, freshwater prawn harvest varied from 592 kg ha⁻¹ to 756 kg ha⁻¹, whereas freshwater prawn yield in monoculture systems, varied from 1140 kg ha⁻¹ to 1295 kg ha⁻¹. This indicates that of the three aquaculture systems, monoculture of *M. rosenbergii* in earthen ponds shows better performance. Survival rates of freshwater prawn in the aquaculture systems, percentage SGR and stocking efficiencies were also higher in polyculture and monoculture ponds of *M. rosenbergii*. Mean annual freshwater prawn yields in major, medium and minor perennial reservoirs were 1.34 kg ha⁻¹, 3.43 kg ha⁻¹ and 4.1 kg ha⁻¹ respectively.

Present analysis also indicated that due to repeated stocking of *M. rosenbergii* in all three categories of perennial reservoirs, there has been a significant increase in the freshwater prawn harvest. However, there is significant spatial variation in *M. rosenbergii* yields in perennial reservoirs. Mean contribution of freshwater prawn to the total yield ranged from 1.6% in major perennial reservoirs to 3% in minor perennial reservoirs. In summary, the highest performance, both in terms of production and economic returns, was in the monoculture system of *M. rosenbergii* in earthen ponds. However, expansion of monoculture of freshwater prawn in earthen ponds has limitations. Further development of CBF based on the freshwater prawns appears to be possible.

Keywords: *M. rosenbergii*, postlarvae, polyculture, monoculture, CBF