ABSTRACT OF PH.D THESIS

Title: Study on the morphological, biochemical and histological characteristics of *Macrobrachium rosenbergii* through application of mangrove based feed

Aquaculture plays an important role in Indian economy and is intricately linked with the socio-economic standard of the Indian fish farmer. Considering the high risk of disease outbreak and environmental pollution associated with the aquaculture practice, the researchers have shifted their interest from shrimp culture (*Penaeus monodon*) towards the culture of freshwater prawn, *Macrobrachium rosenbergii*. This species is a highly demanding food item in terms of both domestic and export markets. In the present programme, the impact of mangrove based feed on the culture species *M. rosenbergii* is investigated with respect to its morphological, biochemical and histological characteristics. The overall rating of the formulated feed considering the environmental issue, production and quality is ENT feed (feed incorporated with green seaweed *Enteromorpha intestinalis*) > control feed > POT feed (feed incorporated with salt-marsh grass *Porteresia coarctata*) > ML feed (feed incorporated with mixed mangrove litter). However economic analysis revealed that the experimental group applied with ENT feed resulted in higher income and BCR (benefit-cost ratio) followed by the experimental groups applied with control, POT and ML feed. Such significant variation may be attributed to increased prawn production and low FCR (feed conversion ratio) which are the primary success indicators in any aquaculture experiment. The superior performance of ENT feed compared to the other formulated feed has led to focus attention towards the seaweed resources of Sundarbans mangrove eco-region which requires further investigation in context to their nutritional status and culture prospect.

The core findings of the present study are highlighted below:-

1. Water quality upgradation of the experimental culture system due to application of mangrove based feed.
2. Significant variation (upgradation) of condition factor, survival, SGR (specific growth rate), FCR, body weight and length-weight relationship of *M. rosenbergii* due to application of mangrove based feed.
3. Significant variation of protein, lipid and carbohydrate concentration in abdominal muscle of *M. rosenbergii* thereby improving the edible quality.
4. Cytomorphological change of prawn muscle fibre indicating hypertrophic growth as synchronized with days of culture (DOC).
5. BCR analysis as the best success indicator of ENT feed which resulted in maximum growth and production performance as reflected through FCR value.

Therefore the standardization of *Enteromorpha intestinalis* culture technology should be taken up to ensure backup supply of raw material for fish feed preparation as well as to conserve these marine resources. The seaweed can be cultivated through 'rope culture technique' which is cost-effective and can open avenue towards alternative livelihood for poor island dwellers of Indian Sundarbans.

Kunal Mondal