

RESEARCH ARTICLE

## Impact of eco-physiological parameters on the tissue metabolism of penaeid prawn, *Penaeus indicus*

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**ABSTRACT :** In the estuaries and brackishwaters of Thummalapenta seacoast, near Kavali, *Penaeus monodon*, *Penaeus indicus* were the dominant penaeid prawns available throughout the year. Based on the availability, diversity and of nutritional significance, the species of prawn of diverse habitats have been chosen for the present investigations. The main objective of the present study was to correlate physiological and metabolic processes occurring in the prawn to their respective habitat conditions. Since, the biotic and abiotic factors of the water and soil have a profound influence on survival, growth and reproduction of the aquatic animals including crustaceans, it is essential that there should be a harmonious interaction between the sum total of the biotic and abiotic factors of the environment with that of the sum total of the physiological and metabolic processes of the biota. In the present study, an attempt has been made to study the aspects concerning energy metabolism and nitrogen excretion in the prawn species inhabiting two different natural environs, which provide insight into the patterns of metabolism occurring *in situ* in the prawns and this has a bearing on its survival and adaptation.

**Key words :** Brackish water, *Penaeus indicus*, Biotic and Abiotic factors

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### INTRODUCTION

Shrimp farming has changed from its traditional, small-scale form in Southeast Asia into a global industry. The macrurans, which were included in the phylum arthropoda comprise of marine and freshwater prawns. Like other crustaceans, they are also known for diversity and adaptability to the influence of varying environmental factors. To understand its ecological and physiological potentiality, a basic understanding of the dynamic interaction between the environment and metabolic capacity is essential (Vernberg, 1983; Claybrook, 1983; Durand and Regnault, 1998; Harris *et al.*, 2001; Henry *et al.*, 2003; Furriel *et al.*, 2004). Therefore, the field of approach is oriented towards the study of physiological properties in relation to ecological factors treating various physiological states as a function of the corresponding parameter in the environment (Davie, 2002).

Crustaceans represent a unique group of animals. During the evolutionary process of adaptive radiation, various species have occupied extremely diverse habitats ranging from deep sea to terrestrial mountains. The

number of decapods in a habitat is a function of the structural complexities of the habitat (Abele, 1974). The relationship between habitat complexity and species richness is usually positive (Linton and Greenaway, 2000). A good number of crustaceans are found on the sandy beaches at different latitudes and longitudes (Dahl, 1983; Morris and Van Aardt, 1998; Morris, 2001; 2002; Luquel *et al.*, 2002; Morris and Ahern, 2003). Penaeid shrimps have for many centuries been considered a good source of food. The entire family has been reviewed taxonomically (Holthuijs, 1980) and approximately 125 species are known from the brood Indo-Pacific region (Dall *et al.*, 1991). Reviews of the taxonomy and biogeography of most of the commercially valuable species have appeared (Dall *et al.*, 1991).

### Crustacean metabolism:

The nutritional requirements of crustacea have been reviewed (New, 1976, 1980; Conklin, 1980; Akiyama *et al.*, 1992; Gerard Cuzon *et al.*, 1994; Kanazawa, 1995). In the aquatic environment, particularly sea, the