GROWTH OF THE BLUE SWIMMER CRAB, *PORTUNUS PELAGICUS* (LINNAEUS, 1758) (DECAPODA, BRACHYURA) IN CAPTIVITY

BY

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ABSTRACT

The growth of hatchery produced *Portunus pelagicus* crabs was monitored under laboratory conditions by recording growth at each moult from the 1\(^{st}\) crab instar onwards. Male and female crabs attained sexual maturity by their 12\(^{th}\) and 14\(^{th}\) moult, respectively. The experiment lasted for 455 days when the last crab died. This paper describes the growth of male and female crabs in each mouling stage, with details of their carapace width and length, chelar length and height, abdominal width and length, and total weight. Moulting frequency, secondary sexual characteristics, and moult increments were also monitored. VBGF (Von Bertalanffy Growth Formula) fit was obtained using the methods of Gulland & Holt (1959), Fabens (1965), and Munro (1982). The \(L_\infty\) values calculated by the different methods ranged between 204.1 and 219.8 mm in males, and between 188.6 and 211.8 mm in females.

INTRODUCTION

The blue swimmer crab, *Portunus pelagicus* (Linnaeus, 1758), is the major marine crab landed from bottom trawl nets and set gill nets in India. Because of

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its importance in terms of availability, abundance, and local or export demand, a detailed investigation was conducted on its growth pattern. Moreover, in recent years shrimp culture has encountered heavy losses due to disease outbreaks in Asia, which warrants the need to diversify culture operations in order to utilize the farm and to include other biologically suitable and economically viable crustaceans in the production process. The authors have studied the complete larval development of the species in an elaborative way (Josileen & Menon, 2004) and mass seed production technology has also been developed (Josileen, 2001). The present study provides information on the suitability of the blue swimmer crab for mariculture.

Crustaceans are equipped with a hard exoskeleton that must be shed in order to grow, i.e., through moultling or ecdysis. Quantifying patterns of crustacean growth is difficult. Although there have been many studies, there is no generally accepted or convincing model describing crustacean growth, which is comparable to the models widely applied to fish growth. Among the reasons for this are the complications of incremental, discontinuous growth by moultling and the variety of life history strategies expressed by crustaceans. The best way of describing the growth of many crustacean species is by observing their moultling pattern. Crustacean growth is dependent upon the duration of the intermoult (moult interval) and size increase at each moult (moult increment) (Hartnoll, 1982). The processes of the moultling cycle have been adequately described by Skinner (1985).

This paper presents the growth of *P. pelagicus* from the first crab stage to sexual maturity, and further to the 16th crab stage. Moultling frequencies in males and females, growth increment (length, width, weight), secondary sexual characteristics, the maturation moult, and behaviour during moultling are all described.

**MATERIALS AND METHODS**

The growth of *Portunus pelagicus* from the first instar to stage 16 was studied by rearing the crabs in the laboratory. For this purpose, the juvenile blue swimmer crabs were produced in the hatchery. Forty-five healthy crabs (instar I) within a size range of 2.0-2.5 mm carapace width (CW) were used for the experiments (a total of 3 trials, with 15 crabs each).

First instar crabs were stocked in two-litre capacity plastic tubs (one crab in each tub), reared until they attained 10 mm CW, and then transferred to 30-litre capacity plastic tubs (one crab in each tub) until they reached a minimum size of 35 mm CW. Plastic tubs were provided with a sand bottom and small shelters. These experiments were conducted at a salinity of 35 ± 1‰ in filtered seawater. Ninety percent water exchange was done once each morning between 08.30 and