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Growth, Mortality and Recruitment of *Trachypenaeus curvirostris* in the Western Coast of Taiwan

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ABSTRACT

Seasonal growth, mortalities and recruitment pattern of *Trachypenaeus curvirostris* in the western coast of Taiwan were examined using 6 monthly length-frequency data (February 1992 to July 1992) and analyzed with the ELEFAN methods. Parameters of the seasonalized von Bertalanffy growth equation obtained are (1) K (growth coefficient) = 1.20 year^{-1}, L_∞ (asymptotic length) = 35.60 mm carapace length (CL), C (amplitude of seasonal growth oscillation) = 0.95, WP (winter point) = 0.05 of year for females; and (2) K = 0.96 year^{-1}, L_∞ = 32.40 mm CL, C = 0.95, WP = 0.05 for males. Total mortality obtained through length-converted catch curve with seasonality for females and males are 3.62 and 3.11 year^{-1}, respectively. The natural mortality obtained from empirical equation of Pauly (1980) is 2.32 year^{-1} for females and 2.04 year^{-1} for males. Fishing mortality is 1.30 year^{-1} for females and 1.07 year^{-1} for males. The annual recruitment pattern obtained by back-projecting these length frequency samples onto an arbitrary one-year time axis showed that recruitment occurs in two pulses of approximate equal strength.

Key words: *Trachypenaeus curvirostris, Growth, Mortality, Recruitment, ELEFAN.*

INTRODUCTION

Some biological parameters, such as growth parameters, mortalities, are essential to perform dynamic pool model (yield-per-recruit, Y/R), which has been one of major methods for assessment and management of shrimp stocks (Garcia, 1988). Shrimp growth is very difficult to estimate as its exoskeletons are lost during molting and thus the ageing of an individual is impossible based on traditional methods. Length-frequency analysis may be currently the only method available to obtain reliable estimates of growth and mortality parameters of shrimp (Baelde, 1994).

Because of asynchronous molting of individuals within a year class, von Bertalanffy growth equation (VBGE) is generally fitted to the mean length at estimated age of a year class (Fre'chette and Parsons, 1983; Enin *et al.*, 1996; Etim and Sankare, 1998; Oh *et al.*, 1999). Moreover, since the shrimp growth is strongly affected by water temperature (Pauly *et al.*, 1984), Pauly and Gaschutz (1979) modified the basic VBGE model to incorporate seasonal fluctuation to obtain a better description of shrimp growth. This revised VBGE model is the most widely used model on growth study for crustacean stocks (Etim and Sankare, 1998; Oh *et al.*, 1999).

Catch curve is one of major procedures used to estimate the total mortality. This method, however, is generally applied to organisms that have been aged. When organisms cannot be aged individually, we usually replace catch curve with length-converted catch curve to estimate the total mortality. Because the larger organisms need a longer time to grow through a length class than small ones, the organism growth in length is not linear (Pauly *et al.*, 1984). A

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