# Growth, Mortality and Yield-per-Recruit of Kuruma Shrimp (*Penaeus japonicus*) from Adjacent Waters off Taichung Harbor

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## ABSTRACT

A series of length-frequency distributions of kuruma shrimp, *Penaeus japonicus*, from the adjacent waters off Taichung harbor were used to estimate growth parameters as well as yield-per-recruit using the MULTIFAN method, and to analyze mortality as well as recruitment patterns using the ELEFAN method. A total of 10 months data was collected between February 1992 and January 1993. The growth analysis showed that female shrimps grow more rapidly and reach larger sizes than do males. Parameters of the von Bertalanffy growth equation with seasonal fluctuations obtained were: (1) k (growth coefficient) = 0.23 year$^{-1}$; $L_\infty$ (asymptotic length) = 86.7 mm CL (Carapace length); C=0.95 (amplitude of seasonal growth oscillation) and $t_s$ (start of a sinusoidal growth oscillation) = -0.07 for females; and (2) k = 0.19 year$^{-1}$; $L_\infty$ = 77 mm CL; C = 0.95 and $t_s$= 0.07 for males. Total mortality estimated for males and females was 1.3 year$^{-1}$. Natural mortalities for females and males were 0.67 year$^{-1}$ and 0.58 year$^{-1}$, respectively. Fishing mortality was 0.63 year$^{-1}$ in females and 0.72 year$^{-1}$ in males. The yield-per-recruit analysis suggested the following: (1) the level of yield can be raised if the length is increased at first capture; (2) a further increase in the current fishing effort will also produce an increase in yield, but this increase will be very limited and might entail unsuitable economic costs and biological risks.

## INTRODUCTION

The adjacent waters off Taichung harbor is an important fishing area for shrimp fisheries. The major fishing equipment used is the beam trawl. The time of operation is between evening and the following afternoon. Each haul takes two or three hours.

The kuruma shrimp (*Penaeus japonicus*) is the most abundant and highly valued species

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