

# Growth and Reproductive Biology of the Freshwater Shrimp *Exopalaemon modestus* (Decapoda: Palaemonidae) in A Lake of Korea

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## Introduction

The palaemonid shrimp *Exopalaemon modestus* inhabits the freshwater of the Indo-West Pacific, Siberia, Manchuria, Korea, China, Taiwan (Holthuis, 1980) and is abundant in the fresh water areas of southwest of Korea. Palaemonid shrimps are adapted to a variety of habitats in freshwater, brackish and marine environments. They play important role in the ecosystem of fresh, brackish and marine waters, acting as predators feeding on algae, detritus, crustaceans and meiofauna (Bell and Coull, 1978) and in turn, as preys for fishes and other predators (Anderson, 1985). In Korea *E. modestus*, along with *Palaemon paucidens* De Haan, 1844 and *Macrobrachium* spp, has locally been exploited in inland fisheries areas. The present paper describes size at sexual maturity, brood size, relationship of the reproductive variables to female body size, and reproductive pattern based on seasonal changes in both occurrence of ovigerous females and gonad index. We also estimate the growth parameters of the population of *E. modestus* from length-frequency data analysis (LFDA).

## Materials and Methods

Monthly samples of *E. modestus* were taken between January and December 1999. Shrimps were caught with hand nets (4-mm mesh size) in Young-am Lake, Korea. Carapace length (CL) was measured with a microscope. All of the eggs were counted directly. For fecundity-CL relationship and reproductive output (RO) estimation only females with non-eyed eggs were used. Ovarian stage was divided

into 5 stages according to Guerao et al. (1994). The proportions of sexually mature female, was calculated for each size class. A logistic equation curve was fitted for the proportions of sexually mature females (P). Growth was described using the modified von Bertalanffy growth function (VBGF) for each sex (Pauly and Gaschütz, 1979). The difference in mean gonad index between egg stages was tested using an analysis of variance (ANOVA).

## Results

From this, the estimated size at 50% sexual maturity for females was  $11.55 \pm 1.95$  mm CL. In non-eyed egg stage the mean number of eggs was  $182 \pm 68$ , and the number of eggs per brood ranged from 60 - 353 for females. Brood loss did occur during the incubation. The calculated brood mortality was 7 %. RO was determined from the individual values for females as 17.44. The number of females was significantly greater than that of males in the samples. Ovigerous females occurred from May to September. For females with non-eyed eggs and eyed eggs, there were bimodal distributions. Ovarian dry weight was significantly correlated with CL. The length frequency distribution showed that the populations had two modal size groups per year, displaying similar pattern in both males and females. There was apparent shift in modal length of cohorts with time. The maximum life span was estimated to be 1.08 - 1.33 yr, May-August being considered main spawning period. Based on the growth performance indices ( $\phi'$ ) females were similar in growth rates to males.

## Reference

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