GROWTH OF PINK SHRIMP Farfantepenaeus duorarum (Burkenroad, 1939) IN CAMPECHE SOUND, MEXICO

BY

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ABSTRACT

The growth of Farfantepenaeus duorarum in Campeche Sound was analysed from length-frequency data collected from February 1984 through December 1988. The monthly anomalies of the catch structure for commercial categories, and the monthly relative importance of small, medium, and large shrimp show that the main cohort is recruited to the fishing grounds during October. Following the evolution of this cohort with the ELEFAN I method, we found that the Von Bertalanffy growth equation parameters with seasonal fluctuations were larger than those reported for the same species in the Tortugas fishing grounds, southern Florida. The growth performance index, φ', does not show substantial variation during the four biological years analysed, probably as a result of the relatively stable environment in Campeche Sound.

RESUMEN

Con datos de frecuencias de tallas recolectados de febrero de 1984 a diciembre de 1988, se estudió el crecimiento de Farfantepenaeus duorarum en la Sonda de Campeche, México. El análisis se basa en el seguimiento de la evolución de la cohorte principal que, de acuerdo a la información sobre biología de la especie, las anomalías mensuales en la estructura de la captura comercial, y la importancia relativa por mes de camarones chicos, medianos y grandes, se recluta a la zona de pesca en octubre. Los parámetros de la ecuación de crecimiento de Von Bertalanffy, con oscilaciones estacionales, se estimaron con el método ELEFAN I. Los valores fueron mayores que los reportados para la misma especie en el norte del Golfo de México. El índice del patrón crecimiento, φ', no presentó variaciones importantes en los cuatro años biológicos, probablemente como resultado del ambiente estable de la Sonda de Campeche.

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INTRODUCTION

A review of the knowledge on the biology, ecology, and fisheries of the pink shrimp, *Farfantepenaeus duorarum* (Burkenroad, 1939) in Campeche Sound has recently been made by Arreguín-Sánchez et al. (1997a, b), Gracia et al. (1997), and Ramírez-Rodríguez et al. (2000). They noted that, in spite of the importance of the resource and the current overfishing, studies on population dynamics and stock assessment are scarce. On growth estimates there are reports by Guzmán-Hernández (1987), Arreguín-Sánchez & Chávez (1985), and Gracia (1995), but only the first author mentions methods as well as times from which the data originate. On the Tortugas fishing grounds, southern Florida, several studies present values of growth parameters for *F. duorarum* based on tagging studies (Lindner, 1965; Berry, 1967; Costello & Allen, 1970; Klima et al., 1987) (table I).

Growth studies are essential for the analysis of exploited stocks, because these results will define the age structure of the catch, estimates of mortality and exploitation rates, and available biomass. The growth of shrimp is difficult to estimate reliably because no calcareous structure survives the periodic shedding of the exoskeleton, and shrimp stocks are variable (Garcia & Le Reste, 1981). Growth rates have been derived from mark-recapture data or other data from which temporal changes in size can be estimated, but published estimates based on mark-recapture have shown relatively wide variations (Rothschild & Brunenmeister, 1984). Given the current overfishing of pink shrimp in Campeche Sound, we decided to undertake a series of detailed studies on the basic population processes to understand how the stock responds to exploitation. The focus of the present work is to estimate the growth of *F. duorarum*.

MATERIALS AND METHODS

The information consists of data of total length (mm) and total weight (g) of shrimp randomly selected from the catch disembarked at the port of Campeche from February 1984 through December 1988. These data were collected by the National Institute of Fishing, and arranged as monthly length-frequency distributions using length classes of 10 mm. For the same period, commercially classified catch data (shrimp tails per pound) were available.

The total weight : total length relationship was estimated based on 946 individuals of both sexes ranging from 60 to 180 mm and from 2 to 61 g. The isometric property for growth was determined by using Student’s *t*-test following Pauly (1984).

Because of the short life of shrimp, we found it convenient to identify the evolution of the main cohorts to estimate growth using a biological year. To