JUVENILE PINK SHRIMP, *FARFANTEPENAEUS DUORARUM* (BURKENROAD, 1939): LENGTH COMPOSITION IN THREE NURSERY AREAS IN CAMPECHE SOUND, GULF OF MEXICO

BY

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ABSTRACT

Characteristics of the recruitment of juvenile pink shrimp, *Farfantepenaeus duorarum* in three nursery areas in Campeche Sound, southern Gulf of Mexico, were analysed from length-frequency data collected from 1992 through 1995, and from catch-per-unit-effort data from 1994 to 1995. Three juvenile size categories were determined: small (10-39 mm TL), medium (40-49 mm TL), and large (50-130 mm TL). The abundance was higher during the rainy and windy months, and was lower during the dry season, but there were differences in duration of the recruitment season and in the size of the shrimp recruiting to each area. Small juvenile pink shrimp were present all year, which gives evidence of continuous reproduction with different intensities. The 1995 recruitment season was shorter than that in 1994 and showed low abundance. The monthly size composition of juvenile pink shrimp was related to gear selectivity, but true values probably depend on environmental influences on recruitment. The size composition of juvenile *F. duorarum* can change by zone or season.

RESUMEN

Para determinar características del reclutamiento de juveniles de camarón rosado *Farfantepenaes duorarum* a tres áreas de crianza en la costa de la Sonda de Campeche, México, se analizan datos de frecuencia de tallas recolectados de 1992 a 1995 y de captura por unidad de esfuerzo de 1994 y 1995. Se determinó la importancia relativa de las categorías de camarones juveniles chicos (10-39 mm LT), medianos (40-49 mm LT) y grandes (50-130 mm LT). El patrón de abundancia muestra valores altos durante la estación de lluvias y vientos, y bajos en la seca. Se observaron cambios en la duración de las temporadas de reclutamiento y en los tamaños de los camarones que se reclutan. Los individuos chicos estuvieron presentes todo el año, evidenciando la reproducción continua. La temporada de 1995 fue más corta que la de 1994 y la abundancia de juveniles disminuyó notablemente. En la composición por tallas influye la selectividad de los arnes de pesca y puede

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INTRODUCTION

The pink shrimp, *Farfantepenaeus duorarum* (Burkenroad, 1939) fishery in Campeche Sound, southern Gulf of Mexico, collapsed in the middle 1990s. This has been related to the effects of overfishing on growth and recruitment, associated with changes in fishing effort and environmental factors (Gracia, 1995; Arreguín-Sánche et al., 1997a, b; Ramírez-Rodríguez et al., 2000; Ramírez-Rodríguez & Arreguín-Sánchez, 2003a).

In general, information has come from adult pink shrimp exploited offshore by the industrial fishery. Knowledge of the early development stages and juvenile pink shrimp are scarce. Juvenile shrimp are important, because they are exploited in coastal nursery areas by the artisanal fleet, and also because survivors constitute the recruits to offshore areas (Gracia, 1995; Gracia & Vázquez-Bader, 1999; Ramírez-Rodríguez et al., 2003). Besides the economic value, this population represents an important link in the food chain at different levels, from postlarvae through adult stages.

The biology of *Farfantepenaeus duorarum* in Campeche Sound has been reviewed by Gracia (1997) and Ramírez-Rodríguez & Arreguín-Sánchez (2000, 2003b). Pink shrimp spawn all year. Migration of larvae and postlarvae towards nursery areas is related to the rainy and windy season (June to January), primary productivity, and ocean circulation patterns. After 25 days, the individuals arrive to the coastal nursery areas where they settle down as juveniles of 12 mm total length (TL) and remain there until they are 73 days old and 115 mm total length. The modal size of the catch is between 35 and 40 mm TL (Gracia, 1995). Pink shrimp emigrate as subadults from the nursery areas toward offshore areas at 3 to 4 months old, to complete growth and to reproduce.

Linkages between inshore nursery grounds and offshore fishing grounds are complex and apparently poorly understood, but Gracia (1995) found that because of overfishing, the artisanal shrimp fishery causes a decrease in offshore production directly proportional to the amount captured. Recruitment of pink shrimp to the offshore fishery occurs throughout the year, with two peaks of recruitment: a fall recruitment from July through November, peaking between August and October, and a spring recruitment from December through June, peaking between March and May. Ramírez-Rodríguez & Arreguín-Sánchez (2003a) and Ramírez-Rodríguez et al. (2003) showed that recruitment is particularly affected by adult stock size and the environmental conditions experienced by each cohort during