MORPHOMETRIC RELATIONSHIPS OF LENGTH-LENGTH AND LENGTH-WEIGHT IN PARAPENAEUS LONGIROSTRIS (LUCAS, 1846) (DECAPODA, PENAEIDAE)

BY

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ABSTRACT

The objective of this study was to determine the length-length and length-weight relationships in Parapenaeus longirostris as a basis for conversions. Specimens were collected with hauls from the commercial trawler “Hapuloğlu” between 9 and 12 December 2006 in Sığacık Bay and Kuşadası Bay in the Aegean Sea. Morphometric equations for the conversions of length and weight were constructed for females, males, and combined sexes. The equations for carapace length (CL), total length (TL), and body width (BW) for combined sexes were found as: CL = 0.2296 × TL − 2.272, r² = 0.97; BW = 0.3708 × CL + 0.7694, r² = 0.91; and BW = 0.0861 × TL − 0.169, r² = 0.90, respectively. The length-weight relationship was determined as: W = 0.0031 × TL².108, r² = 0.98 for total length and W = 0.546 × CL².743, r² = 0.97 for carapace length. Males were generally smaller than females (K-S test; p < 0.05) and size-frequency distributions (TL, CL, and BW) revealed differences between females and males (K-S test; p < 0.05). Various length-length and length-weight regressions were also found to differ with sex (F test; p < 0.05), except TL-CL (F = 0.40; p > 0.05).

RÉSUMÉ

L’objectif de cette étude a été de déterminer les relations longueur-longueur et longueur-poids chez Parapenaeus longirostris pour servir de base de conversion. Les spécimens ont été collectés à l’aide des traits de filet par le chalutier commercial “Hapuloğlu” entre le 9 et le 12 décembre 2006 dans les baies de Sığacık et Kuşadası, en mer Égée. Les équations morphométriques pour les conversions de la longueur et du poids ont été établies pour les femelles, les mâles et les sexes combinés. Les équations pour la longueur de la carapace (CL), la longueur totale (TL) et la largeur du corps (BW) pour les sexes combinés sont respectivement de: CL = 0.2296 × TL − 2.272, r² = 0.97; BW = 0.3708 × CL + 0.7694, r² = 0.91; et BW = 0.0861 × TL − 0.169, r² = 0.90. La relation longueur-poids a été déterminée comme W = 0.0031 × TL².108, r² = 0.98 pour la longueur totale et W = 0.546 × CL².743, r² = 0.97 pour la longueur de la carapace. Les mâles

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sont en général plus petits que les femelles (K-S test; \( p < 0.05 \)) et la fréquence de distribution des tailles (TL, CL et BW) révèle des différences entre les femelles et les mâles (K-S test; \( p < 0.05 \)). Différentes régressions longueur-longueur et longueur-poids montrent aussi une différence entre les sexes (F test; \( p < 0.05 \)), sauf pour TL-CL (\( F = 0.40; p > 0.05 \)).

**INTRODUCTION**

The deep-water rose shrimp, *Parapenaeus longirostris* (Lucas, 1846) (Penaeidae), a large but short-lived decapod crustacean, is the main target species of a large trawl fleet fishing in the Aegean Sea. It inhabits the entire Mediterranean (Fischer et al., 1987) and can be found at depths between 20 and 700 m, but it is common and abundant on sandy-muddy bottoms between 100 and 400 m (Bombace, 1972).

*P. longirostris* can grow up to 16 cm (males) and 19 cm (females) total length. However, males are usually 8 to 14 cm long and females 12 to 16 cm long. Larger specimens are caught mainly in deeper waters. The growth rate differs between the sexes. Size distribution and growth parameters indicate a life cycle of 3-4 years and both sexes of *P. longirostris* reach maturity in the first year of life in the Mediterranean Sea (Froglia, 1982).

The most frequently used dimensions among a variety of body measurements in penaeid shrimps (and other crustaceans) are carapace length, body length, total length, body width, and wet weight (Sukumaran & Neelakantan, 1997; Primavera et al., 1998). Measuring of any specific length measurement, such as total length or body length compared to the carapace length, may often be somewhat difficult and therefore take much time. It is thus convenient being able to convert into the desired length measurement when only one of the other length measurements is known, and also the length-weight regression may be used to estimate length from weight. Various body length measurements, e.g., height, width, and girth, different from total length or carapace length are used to design more selective cod ends (changing mesh shape or mesh size) for target fish related to body shape, and species-selective devices in multispecies fishery. Length-length and length-weight relationships are often used to calculate the standing stock biomass or condition indices, and are in addition used in the analysis of ontogenetic changes and several other aspects of fish or crustacean population dynamics (Lagler, 1968).

Very little is known about the biological characteristics of *Parapenaeus longirostris* along the Turkish coast of the Aegean Sea, so the objective of this study was to provide the length-length and length-weight relationships in *P. longirostris* as a basis for hardy converts. For this reason, morphometric relationships of the species including carapace length, total length, body width, and weight were investigated.