

A COMPARATIVE STUDY ON FISHERY AND BIOLOGY OF *PARAPENAEUS LONGIROSTRIS* IN E. IONIAN AND S. ADRIATIC SEAS

KOSTAS KAPIRIS¹, OLIVERA KASALICA², DIMITRIS KLAOUDATOS¹, MIRKO DJUROVIC²

¹*Hellenic Centre for Marine Research, Institute of Marine Biological Resources, 470 km Athens-Sounio, Mavro Lithari P.O. Box 712, 19013, Anavissos, Attica, Greece*

²*Institute of Marine Biology, Dobrota P.O.Box 69, 85330 Kotor, Montenegro*

KOMPARATIVNA STUDIJA ULOVA I BIOLOGIJE *PARAPENAEUS LONGIROSTRIS* U ISTOČNOM JONSKOM I JUŽNOM JADRANSKOM MORU

INTRODUCTION

The deep water rose shrimp, *Parapenaeus longirostris* (Lucas, 1846), shows a wide geographic distribution in the E. Atlantic, as well as in the Mediterranean and its adjacent seas and its bathymetric distribution ranges between 20 and 750 m. In the above area, many studies carried out in the last years allowing collecting detailed information on its ecology and biology (e.g. Sobrino *et al.*, 2005). This is the first attempt to describe and compare the actual information available concerning fishery and biology of this species in Greek (E. Ionian) and S. Adriatic Sea (Montenegrin) waters, in the period 2006-2008.

MATERIAL AND METHODS

The samples were caught in the frame of the MEDITS Project and the National Project of Fishery Collection Data in Greece and from National Project of Monitoring of Demersal resources and FAO-ADRIAMED Project from Montenegro. All samples were caught using an experimental (MEDITS, 20 mm cod end) or commercial trawler (National and FAO-ADRIAMED, 40 mm cod end stretched mesh size). The sampling depth was between 71-586 m in Greek and 50-200 m in S. Adriatic waters. A total of 3059 ind. (1802 females, 1257 males) were caught in the Ionian and 2167 ind. (1539 females, 628 males) from the Montenegrin waters.

RESULTS

This shrimp is one of the most important species of the crustacean landings in Aegean and Ionian Greek seas (Kapiris *et al.*, 2007). The used fishing gears are trawls, seine nets, ring nets and other (Hellenic Statistical Agency data, ELSTAT data). Its annual catches showed a weak negative trend with time (2000-2008) and the annual economic value ranged from 22%-50% of the total crustacean value. An evaluation of the exploitation state of this resource indicates a general over- or full exploitation in Greek waters (Kapiris *et al.*, 2007).

The last decade this shrimp represents a very high CPUE consisting one of the most important commercial species in Montenegrin trawl fishery (Kasalica *et al.*, 2007). An estimation of the exploitation state of this resource indicates that this population is not threatened by high rate of the trawler fishing (Kasalica, 2005).

The carapace length (CL) of females in both areas (7.08-36.86 mm, in the Greek waters and 14-37 mm in Montenegrin waters) was statistically bigger than males (11-32.48 mm and 14-32 mm in the Greek and Montenegrin waters, respectively) (Mann-Whitney test, $P > 0.05$). In general, the mean value of females' CL caught in Greek waters (21.94 mm \pm 5.79) was statistically bigger than that of the S. Adriatic (19.93 mm \pm 11.20), while the mean value of the males' CL caught in the Ionian (18.90 mm \pm 3.87) was significantly smaller than that of the Montenegrin one (21.08 mm \pm 2.56) (Kolmogorov-Smirnov test, $P = 0.00$, in both cases).

Accordingly, females were statistically heavier than males, in both areas. In both areas, the younger individuals (CL: 7-12 mm) were caught in summer. The sex ratio (M/M+F) indicated that females were more abundant in both areas (0.408 and 0.286, for Greek and Adriatic fishery, respectively). This size dimorphism for the species has been shown in many other studies carried out in the Mediterranean (e.g. Sobrino *et al.*, 2005).

A clear CL-depth distribution was not found in both areas, for both sexes. The correlation coefficients of the linear model (Depth = $a + b \cdot$ carapace length) were low, especially in Montenegro. The results for the CL-weight relationships by sex showed a negative allometry in growth, giving b values significantly less than 3, especially for males. The estimated slopes (b values) were higher, as expected, for the Greek specimens (2.620 and 2.389, for Greek ♀ and ♂, 2.309 and 2.032 for Montenegrin ♀ and ♂).

Bhattacharya's method (FiSAT package), was used to identify and isolate the different size groups, for both sexes. The general pattern showed that the males exhibited 2 (Ionian) and 1-year (Montenegro), while females showed more (3 and 2-year modes for Ionian and Adriatic, respectively). The estimated mean values were lower than those of the rest Mediterranean (Sobrino *et al.*, 2005) reflecting possibly the different fishing exploitation of this resource.

The Montenegrin females presented a higher mean CL in each maturity stages (Stage I: immature, Stage II: maturing, Stage III: mature, Stage IV: spent) (t test, $P = 0.00$). Although, the minimum mature females' CL was much lower in the Ionian (10 mm) than the S. Adriatic (16 mm). In the Ionian Sea mature female presented two peaks: one in spring and the other in autumn, while the spawning season is much more protracted in Montenegrin waters. In this area, mature females (stage III) found all the sapling months, with a slight peak in autumn-beginning of winter, reinforcing the view that the reproductive activity is continuous year-round.

DISCUSSION

The observed differences in biology and ecology of *P. longirostris* could be attributed to the different mesh size of the trawler, the sampling depth, and the different hydrological conditions and, obviously, to the different fishing pressure prevailed in both areas.

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