

ASPECTS OF THE REPRODUCTIVE BIOLOGY OF THE SQUAT LOBSTER *MUNIDA RUTLLANTI* ZARIQUIEY ALVAREZ, 1952 (DECAPODA: GALATHEIDAE) IN THE ADRIATIC SEA

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Abstract

Reproductive biology of *Munida rutllanti* was investigated for the first time in the Adriatic Sea. Carapace length of males ranged from 10.5 to 21.5 mm, while in females it ranged from 11.2 to 19.4 mm. Sexual dimorphism was observed in seven morphometric characters. Ovigerous females were first observed in summer and later in autumn with higher frequency. Realized fecundity showed wide variation (273-3250 eggs) and positive correlation between the brood and female size.

Keywords: *Decapoda, Reproduction, Adriatic Sea*

Introduction

Munida rutllanti Zariquiey Alvarez, 1952 is an Atlanto-Mediterranean species occurring from the northwestern coast of Spain to Morocco and in the entire Mediterranean basin where is mostly found on muddy and shell-sand grounds of the continental shelf and upper slope. It constitutes well-established populations in the western Mediterranean and recently it has been more frequently reported from its eastern part. Due to its progressive spread, it is not surprising that this species has been reported in the Adriatic only after 2000 [1]. Despite the fact that *M. rutllanti* has been studied in other Mediterranean areas [2,3], we describe for the first time some biological parameters of this species from the eastern Adriatic.

Materials and Methods

The investigation was carried out in the eastern part of the central Adriatic Sea from May 2008 to April 2009 and total of 701 *Munida rutllanti* specimens were obtained. Samples were collected at depths from 110 to 200 m with commercial bottom trawl. Ovigerous condition of females was determined by presence or absence of eggs on pleopods. Ovigerous females were classified as 'non-eyed' (embryo without ocular pigment) and 'eyed' (embryo with ocular pigment) according to the stage of embryonic development. Fecundity was regarded as realized reproduction, which represents the number of eggs per clutch and was expressed by the regression equation of log-transformed number of eggs on carapace length at 'non-eyed' eggs of ovigerous females. To determine egg diameter, a subsample of 28 ovigerous females carrying eggs at the same stage of embryonic development was selected. Since the change in the allometry of cheliped growth represents the acquisition of secondary sexual characters, the same was used to determine size at morphometric maturity of males.

Results and Discussion

Carapace length (CL) of *Munida rutllanti* males ranged from 10.5 to 21.5 mm, while in females it ranged from 11.2 to 19.4 mm (Fig.1). Mean values of total length (TL), total carapace length (TCL), anterior carapace width (ACW), abdomen width (AW), cheliped length (ChL), propod length of cheliped (LCh) and propod width of cheliped (ACh) of males were statistically larger than of females (*t*-test: $t_{0.05} = 12.23$, $p = 0.0005$; $t_{0.05} = 6.01$, $p = 0.0005$; $t_{0.05} = 5.10$, $p = 0.0005$; $t_{0.05} = 2.65$, $p = 0.008$; $t_{0.05} = 13.38$, $p = 0.0005$; $t_{0.05} = 13.28$, $p = 0.0005$; $t_{0.05} = 14.39$, $p = 0.0005$, respectively). This evident sexual dimorphism was previously reported for this species and other members of *Munida* genus [4]. Throughout the whole year, ovigerous females were first observed during summer months and were represented by 27.45% among the females, of which 76.19% were carrying 'non-eyed' embryos. In autumn, 48.95% of total females were ovigerous and most of them also brood 'non-eyed' embryos. The smallest ovigerous female measured 11.3 mm carapace length which suggest 11 mm CL as the size at physiological maturity of females. Present results indicate a wide variation in realized fecundity from 273 to 3250 eggs (average 1182 eggs) with egg number increasing with female CL. The regression analysis of carapace length versus number of eggs is given with equation: $\log F = 0.718 + 0.1478 \log CL$, ($R^2 = 0.507$). The average fecundity value and observed egg diameter (0.28 - 0.46 mm) in this study are somewhat lower when compare to other *Munida* species [4,5]. Cheliped growth was negatively allometric for immature males and positively allometric for mature males with an inflexion point at a CL value of 13.9 mm which represents the morphological size at maturity. In this study, with 74.41% of males being morphologically mature, we assumed that they will ensure the next offspring production. Finally, there is an indication of an annual and seasonal reproductive cycle with distinct summer/autumn breeding period for *M. rutllanti* in the Adriatic Sea, however, only a further study based on

monthly samples throughout at least a two-year period will provide a better understanding of seasonality of the reproductive cycle.

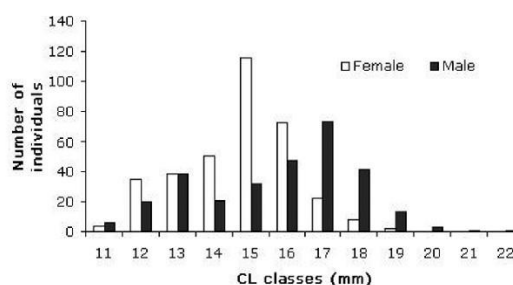


Fig. 1. The carapace length class of *Munida rutllanti* specimens from the eastern Adriatic

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