

ON THE REPRODUCTION OF *ACANTHEPHYRA EXIMIA* S. I. SMITH, 1884 IN THE CENTRAL WESTERN MEDITERRANEAN

Alice Gastoni ^{1*}, Ivan Locci ¹, Antonello Mulas ¹ and Maria Cristina Follesa ¹
¹ Department of Animal Biology and Ecology – University of Cagliari - gastoni@unica.it

Abstract

Macroscopic and histological analysis were performed on the female gonads of *Acantheephyra eximia*. The macroscopic observation regarding the changes of the ovaries leads us to identify six stages of development, validated by histological analysis.

Keywords: *Decapoda, Western Mediterranean, Reproduction*

Introduction

Acantheephyra eximia S. I. Smith, 1884 is a cosmopolitan nektonic species, common in waters below 1000 m [1, 2], where it represents the most abundant decapod of the lower-slope communities [3]. Nevertheless, the current knowledge on its biology, especially on the reproductive cycle, is scanty. Aim of this work is to provide some information concerning the reproductive pattern of this species.

Materials and Methods

Samples of *A. eximia* were collected from experimental trawl surveys carried out between 580 and 1598 m in the Sardinian waters from 2003 to 2009. Carapace length (CL, in mm), total and ovarian weight (TW, OW in grams) for each specimen were registered. The determination of stage's development maturity was performed using macroscopic descriptions validated by histological examinations. Preparation of ovarian tissues for microscopic analysis, performed following Dominici's method [4], included fixation, sectioning, oven drying and staining.

Results and Discussion

We analysed 478 females of *A. eximia*, the carapace length ranged from 8.2 to 38.0 mm CL, with a mean \pm SD of about 27.0 ± 4.6 . The range size of females carrying eggs was 22.1 - 35.4 mm CL. The smallest and the biggest spermatophores-bearing specimens measured 25.8 and 35.4 mm CL respectively. During the analysis, six developmental stages changing shape, dimension and colour, were identified (Tab.1).

Tab. 1. Developmental stages scale proposed for *Acantheephyra eximia* caught in the Sardinian sea

Stage	Macroscopical description
I, Immature	Ovaries thin and whitish. Eggs not visible
II, Developing	Ovaries yellow in colour, growing. Eggs start to be visible
IIIa, Maturing	Ovaries turgid and pale-orange in colour. Eggs achieving greater dimensions
IIIb, Pre-spawning	Ovaries bright-orange in colour and swollen in the cephalotoracic region
IV, Spawning	Ovaries vivid red in colour. Eggs ready for spawning
V, Post-spawning	Ovaries flaccid, thin and transparent
Stage	Hystological description
I, Immature	Oogonia and primary oocytes in the germinative zone. Follicular cells appear
II, Developing	Lipidic vesicles oocytes appear, primary vitellogenesis starts (oocytes Y1)
IIIa, Maturing	Secondary vitellogenesis starts (oocytes Y2). Follicular cells flatten
IIIb, Pre-spawning	Tertiary vitellogenesis starts (oocytes Y3). Nucleus disappearing
IV, Spawning	Ovary entirely filled with oocytes. Nucleus disappears
V, Post-spawning	Empty follicles and atresic oocytes undergoing phagocytosis

In the present study, a complete macroscopic and histological description of the various maturity stages has been performed. During monthly samplings, carried out throughout the year (except in April, October and December), we observed a regular occurrence of females with different developmental ovarian stages. In particular mature females (stage IV) were found in March and September (28 out of 290 and 1 out of 65, respectively) (Fig. 1).

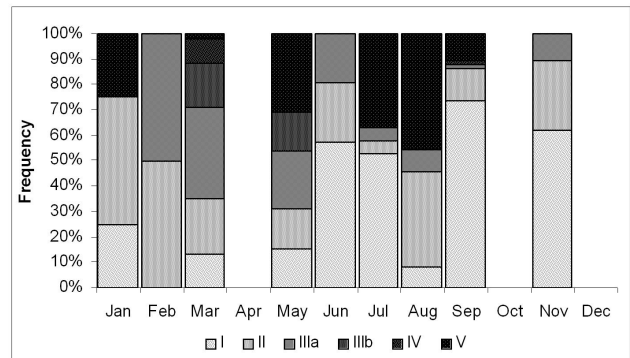


Fig. 1. Annual trend in percentage occurrence of different maturity stages of females of *Acantheephyra eximia* caught in the Sardinian sea

Eggs are carried in a big clutch among the pleopods, their colour matches with the pleon, likely a sort of camouflage, as observed for other middle-slope decapod crustaceans [5].

References

- Morales-Nin B., Maynou F., Sardà F., Cartès J.E., Moranta J., Massuti E., Company J., Rotllant G., Bozzano A., Stefanescu C. and Lirò C., 2001. Size influence in zonation patterns in fishes and crustaceans from deep-water communities of the western Mediterranean. *NAFO SCR Doc.* 01/142.
- Koukouras, A., 2000. The pelagic shrimps (Decapoda Natantia) of the Aegean Sea with an account of the Mediterranean species. *Crustaceana*, 73: 801–814.
- Cartes J.E., 1991. Analisis de las comunidades y estructura trofica de los crustaceos decapodos batiales del Mar Catalan. *Tesis Doctoral, Universitat Politecnica de Catalunya*.
- Mazzi V., 1977. Tecniche istologiche e istochimiche. Eds. Piccin, pp 750.
- Cabiddu S., Follesa M.C., Gastoni A., Porcu C. and Cau A., 2008. Gonad development of the deep-sea lobster *Polycheles typhlops* (Decapoda: Polychelidae) from the central western Mediterranean. *J. Crust. Biol.*, 28(3): 494-501.