BIOLOGY AND ECOLOGY OF THE TRANSPARENT GOBY *APHIA MINUTA* (RISSO, 1810) IN THE LAGOON OF NADOR (MOROCCO)

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Abstract
The transparent goby *Aphia minuta* is a fish (Pisces, Gobiidae) of small size (60-70 mm) and its geographical distribution is limited to the East of the Atlantic Ocean, from Gibraltar to the Norwegian coasts, also known from the Mediterranean including Black Sea and the Azov. This marine and brackish fish is a pelagic-neritic species inhabiting inshore and estuarine waters, over sand, mud and eel-grass. Adults feed on zooplankton, especially copepods, cirripede larvae and mysids. *A. minuta* is distinguished by a short life cycle, completed after less than one year and by early sexual maturation. The maximum size rarely exceeds 60 mm in the lagoon of Nador. The body is transparent, more or less reddish, with chromatophores along bases of median fins and on head. Males with longer dorsal and anal fins than females.

Keywords: Fishes, Reproduction, Lagoons, South-Western Mediterranean

Introduction - The aim of the study is to evaluate the total length of the populations of the transparent goby *Aphia minuta* in the lagoon of Nador during the period of the intense fishery on this fish: January-May 2015. Monthly samples were analyzed to calculate the first maturity for males and females. The species was studied in Portugal, Spain and Golfe de Lyon [1-6]. The methodology and the results were compared to the bibliography.

Material and methods - Fish samples were collected weekly from landings of the commercial small-scale fishery, during the fishing season (December to March-April 2015). A total of 1183 specimens of *A. minuta* were analyzed (Fig. 1). Total length (TL) was measured to the mm below. Fish wet weight was determined to the nearest 0.01 g. Sex was determined by observation of the gonads under the compound microscope at x40. Sex ratio was expressed as a percentage of males/females in the sample.

Results and discussion-The sex ratio is 1/1 and size of first maturity is 38 mm for females and 34 mm for males. Only one spawn after the age of 6-7 months and the breeding period lasts from December to April with a peak in March. During ontogeny, three phases characterize the species: a pelagic phase composed of larvae, an agglomeration phase consisting of juveniles congregate in shallow waters in the winter and a demersal phase composed of adults that migrate in spring and disperse funds close to sea. The structure of the population (Fig. 1) shows different sizes in the populations mixed with juveniles and adults. The relationship between size and weight is well correlated (Fig.2) compared to the results of [1].

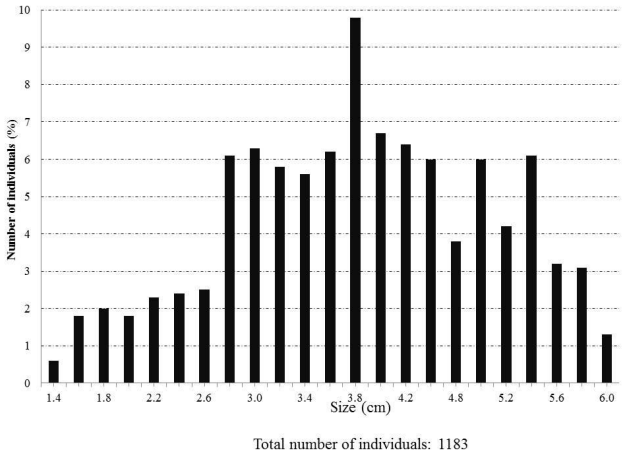

Fig. 1. Structure of the population of *Aphia minuta* in the lagoon of Nador during January-May 2015.

Conclusion- In the lagoon, the breeding season is relatively lengthy with only one spawn during the life cycle. Spawners die after giving eggs, probably as a consequence of the degeneration of the intestinal epithelium. The species is a prey for many fish species and cephalopods.Despite its small size, this species known among the fishermen as the chenquete, is largely exploited by artisanal fisheries developed in the lagoon. Fishing nets used are highly selective, with a very small mesh and are used seasonally. Seine nets and small trawls are used from January to May by 5-7 small fishing boats. The identification of the species requires genetic studies and the direct stock assessment requires more research to preserve the species.

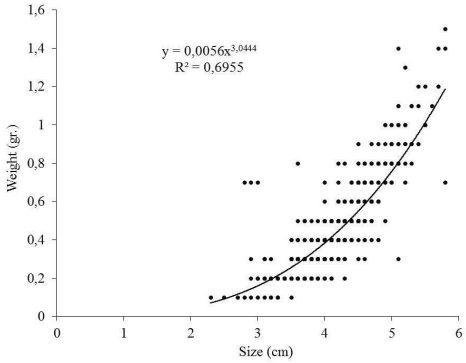

Fig. 2. Relation size-weight of *Aphia minuta* in Nador Lagoon.

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References
1 - Iglesias M. and B. Morales-Nin. 2001. Life cycle of the pelagic goby *Aphia minuta* (Pisces: Gobiidae) SCI. MAR., 65 (3): 183-192.
2 - Bouchereau, J.L., J.P. Quignard, J.A. Tomasini, J.C. Joyeux and C.H. Capape., 1990. Cycle sexuel, condition et ponte de *Pomatoschistus minutus* (Pallas, 1770) (Gobiidae) du Golfe du Lion, France. Cybium 14 (3):251-267.
3 - Arruda, L.M., J.N. Azevedo and A.I. Neto., 1993. Abundance, age-structure and growth, and reproduction of Gobies (Pisces; Gobiidae) in the Ria de Aveiro Lagoon (Portugal). Estuar. Coast. Shelf Sci., 37: 509-523.
4 - Iglesias, M., E. Massutí, O. Reñones and B. Morales-Nin., 1994. Three small-scale fisheries based on the island of Majorca (NW Mediterranean). Boll. Soc. Hist. Nat. Balears, 37: 33-57.
5 - Iglesias, M., E.B. Brothers, B. Morales-Nin., 1997. Validation of daily increment deposition in otoliths. Age and growth determination of *A. minuta* (Pisces: Gobiidae) from the north-west Mediterranean. Mar. Biol., 129: 279-287.
6 - Froglia, C. and M.E. Gramitto., 1989. La pesca del Rossetto (*A. minuta*) nel medio Adriático. Nova Thalassia 10 (Suppl): 447-455.