

# ASPECTS OF REPRODUCTIVE BIOLOGY OF FEMALE ROUND SARDINELLA, *SARDINELLA AURITA*, IN NORTHERN AEGEAN SEA (GREECE)

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## Abstract

Fecundity and size at maturity are presented for female round sardinella, *Sardinella aurita*, in northern Aegean Sea. The length at first maturity (TL) was 168 mm. Females produced on average 20,976 oocytes (range: 9,700-72,700, SD=7,741). Absolute fecundity increased exponentially with total body length ( $F=0.0949 \times TL^{4.223}$ ) and weight ( $F=511.19 \times W^{1.022}$ ).

**Keywords:** round sardinella, fecundity, size-at-maturity, northern Mediterranean, Aegean

## Introduction

Round sardinella, *Sardinella aurita* Valenciennes, 1847 (Pisces, Clupeidae) is a pelagic shoaling fish of tropical and subtropical distribution (1). Although its reproduction has been studied in the southern Mediterranean Sea (2, 3), there are no data for the northern part of the sea, its northern boundary distribution. This work presents data on female fecundity, its relationship to length and weight and female size at maturity.

## Materials and methods

Samples were collected with beach and purse seiners between September 2000 and August 2001, in Kavala Gulf, northern Aegean Sea. Total female fecundity (F) was estimated for 105 fish using the volumetric method (4). The relationships between mean total fecundity per size class and total length (TL, mm) or weight (W, 0.01 g) were studied using the exponential equation  $F= ax^b$ , where x is either TL or W. Size at first maturity ( $L_{m50}$ ) was estimated using the logistic model (5, 6).

## Results and discussion

The length frequency distribution of the specimens used for fecundity estimates is shown in figure 1. The  $L_{m50}$  was found to be 168.33 mm (95% confidence limits: 165.30 – 171.01). Each spawning female produced an average of 20,976 (SD=7,741) oocytes, ranging between 9,700 and 72,700 oocytes, and 445 (SD=98) oocytes per g of W. Mean absolute fecundity increased exponentially with TL and W:

$$F= 0.0949 \times TL^{4.223} \quad (r^2= 0.91, n=8, P<0.01)$$

$$F= 511.19 \times W^{1.022} \quad (r^2= 0.92, n=8, P<0.01).$$

Absolute fecundity of round sardinella exhibited high variability among individuals of the same size, which is the result of the synergetic effects of genetic differences among the females and environmental factors (7). Although our estimates were within the range reported so far (8, 3), they were close to the lower limit. This might be attributed to the fact that the maximum TL of the North Aegean population is lower compared to those off northwest African (8) and southern Mediterranean (3). The positive correlation of fecundity with size has been reported for round sardinella populations in the Mediterranean and eastern Atlantic (8, 3).

## References

- 1 - Longhurst A.R., and Pauly D., 1987. Ecology of Tropical Oceans. Academic Press, San Diego.
- 2 - Wassef E., Ezzat A., Hashem T., and Faltas S., 1985. Sardine fishery by purse-seine on the Egyptian Mediterranean coast. *Mar. Ecol. Prog. Ser.*, 26: 11-18.
- 3 - Bensahla Talet A., Mortet Y., and Tomasini J.A., 1988. Relations masse-longueur, sex-ratio et reproduction (saison de ponte, fécondités) de *Sardinella aurita* (Val. 1847) des cotes oranaises (Algérie). *Rapp. Comm. Int. Mer Médit.*, 31 (2): V-II 14.
- 4 - Bagenal, T.B. and Braum, E., 1978. Eggs and early life history. Pp. 165-201. In: T.B. Bagenal (ed.), *Methods for Assessment of Fish Production in Freshwaters*. Oxford: Blackwell Scientific Publications.
- 5 - Echeverria, T.W., 1987. Thirty-four species of California rockfishes: maturity and seasonality of reproduction. *Fish. Bull.*, 85: 229-250.
- 6 - Petrakis, G. and Stergiou K.I., 1997. Size selectivity of diamond and square mesh codends for four commercial Mediterranean fish species. *ICES J. Mar. Sci.*, 54: 13-23.
- 7 - Wootton, R.J., 1998. Ecology of Teleost Fishes. 2<sup>nd</sup> edition, Kluwer Academic Publishers Fish and Fisheries Series 24, Dordrecht, The Netherlands.
- 8 - Pham-Thuoc and Szypula J., 1973. Biological characteristic of gilt sardine *Sardinella aurita* Cuv. Et Val. 1847 from northwest African Coast. *Acta Ichthyol. Piscat.*, 3: 19-37.

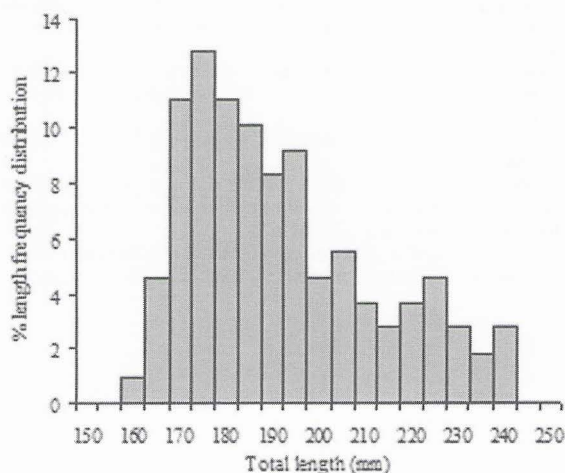


Fig. 1. Length frequency distribution of the round sardinella specimens used for fecundity estimates.