

# BIOMETRIC ANALYSIS OF GILT SARDINE, *SARDINELLA AURITA* VALENCIENNES, 1847, IN THE EASTERN ADRIATIC SEA

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## Abstract

Biometrical characters of gilt sardine, *Sardinella aurita*, were analysed using random samples from the eastern part of the Adriatic Sea from October 2000 to February 2002. The total length of 769 specimens ranged between 8.0 and 28.4 cm. The length-weight relationship was  $W=0.0034TL^{3.214}$ , and positive allometry was established.

**Keywords:** Biometry, *Sardinella aurita*, Adriatic Sea

## Introduction

This study presents the results of a two-year investigation (October 2000 – February 2002) of the gilt sardine, *Sardinella aurita* Valenciennes, 1847, which is distributed in the Atlantic Ocean, the Mediterranean Sea and the Black Sea. Some aspects of its biology in the Adriatic Sea have been described before (1, 2, 3).

The objective of this paper was to examine the morphometric and meristic characters of gilt sardine from the eastern part of the Adriatic Sea and compare those with the ones from the western part of the Adriatic.

## Materials and methods

All samples were taken from the purse seine and beach seine catches from October 2000 to February 2002, which were realised in the Novigrad Sea (44° 15'N; 15° 30'E), Kaštela Bay (43° 35'N; 16° 25'E) and off Šolta island (43° 15'N; 16° 15'E).

Overall, 219 specimens were analysed. All sixteen lengths were measured (nearest mm total length, *TL*) and weights were recorded (nearest 0.01 g wet weight). Twelve morphometric characters were expressed as % of *TL* and three characters as % of head length (*HL*). Five meristic characters were also measured. Length-length relationships were established using linear regression analysis. The length-weight relationship was described using  $W= aTL^b$  (4). The hypothesis of isometric growth was tested with *t*-test. Condition was determined using Fulton's condition factor (*K*).

*F*-test ( $P<0.05$ ) was used to test for significant differences between the mean values of the different morphometric characters between eastern and western Adriatic Sea.

## Results and discussion

*TL* ranged from 8.0 to 28.4 cm (mean =  $13.8 \pm 3.749$  cm), exhibiting modal lengths between 12.0 and 13.5 cm. The values of all characters examined are presented in Table 1. We compared our results with those obtained from the western Adriatic Sea (5). The comparison of morphometric and meristic characters between these two parts showed no statistical difference (*F*-test,  $P>0.05$ ) (Fig. 1). Therefore we can assume that these two populations originated from the same stock although further investigations are necessary.

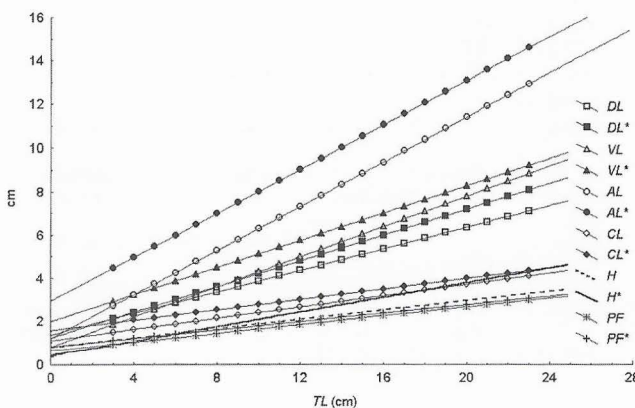


Fig. 1. Length-length relationships of *Sardinella aurita* from the catch samples realised in the eastern and the western (\*) part of the Adriatic Sea.

The length-weight relationship in the Middle Adriatic was  $W=0.0034TL^{3.214}$  ( $n=769$ ,  $r^2=0.9546$ ,  $P<0.001$ ,  $SE(b)=0.0124$ ). The value of  $b=3.214$  was significantly ( $P>0.05$ ) different from 3.0, indicating positive allometry.

Fulton's condition factors ranged between 0.304 and 0.759 (mean= $0.693 \pm 0.0927$ ).

Table 1. Morphological and meristic characters of *Sardinella aurita* (n=219) from the eastern Adriatic Sea, 2000–2002.

Morphological characters	Range (cm)	Mean±SD
Total length ( <i>TL</i> )	11.3-15.0	12.4±0.482
% <i>TL</i>		
Standard length ( <i>SL</i> )	78.91-86.07	82.88±0.704
Distance of dorsal fin ( <i>LD</i> )	32.28-39.83	36.00±1.178
Distance of anal fin ( <i>LA</i> )	53.68-65.55	60.74±1.174
Distance of pelvic fin ( <i>LV</i> )	34.40-45.08	41.42±1.005
Distance of pectoral fin ( <i>LP</i> )	15.52-22.03	19.77±0.887
Head length ( <i>HL</i> )	17.36-23.93	21.95±0.835
Maximum body height ( <i>H</i> )	15.52-23.28	18.26±1.058
Minimum body height ( <i>h</i> )	6.03-8.62	6.99±0.516
Length of dorsal fin basis ( <i>DF</i> )	10.34-14.66	12.25±0.677
Length of pectoral fin ( <i>PF</i> )	14.66-18.97	16.22±0.740
Length of anal fin basis ( <i>AF</i> )	10.34-14.66	12.36±0.659
Length of ventral fin ( <i>VF</i> )	7.76-10.34	9.32±0.522
% <i>HL</i>		
Pre-orbital length ( <i>Se</i> )	30.77-38.46	36.20±2.164
Eye diameter ( <i>Ee</i> )	23.08-30.77	27.33±1.58
Post-orbital length ( <i>Po</i> )	38.46-50.00	42.00±2.467
Meristic characters		
Number of rays in dorsal fin ( <i>D</i> )	15-17	16.28±0.592
Number of rays in anal fin ( <i>A</i> )	12-16	13.88±0.792
Number of rays in ventral fin ( <i>V</i> )	7-9	8.87±0.378
Number of rays in pectoral fin ( <i>P</i> )	13-17	15.02±0.667
Number of vertebrae ( <i>Vert.</i> )	46-48	47.00±0.408

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