

ON THE BIOLOGY OF ADRIATIC SOLE, *SOLEA IMPAR* BENNETT, 1831 (PISCES; SOLEIDAE), OFF THE SW COAST OF SICILY

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Abstract

The age and growth, weight-length relationship and sexual maturity of Adriatic sole, *Solea impar* Bennett, 1831 were studied for 283 specimens caught in 2002 off the south-west coast of Sicily. Age was determined from reading 230 otoliths. The growth parameters estimated by sex were: L_{∞} = 234.62 mm, K = 0.29 yr⁻¹, t_0 = -2.39 yr for females and L_{∞} = 223.81 mm, K = 0.25 yr⁻¹, t_0 = -3.14 yr for males. The parameters of the weight-length relationship were: a = $2 \cdot 10^{-6}$, b = 3.269 and a = $8 \cdot 10^{-6}$, b = 3.011 ($W = aL^b$) for females and males, respectively.

Key-words: *Solea impar*, age, growth, sexual maturity, Sicily

Introduction

The Adriatic sole, *Solea impar* Bennett, 1831 is a target species of the Sicilian artisanal fishery. It inhabits sandy and muddy bottoms at a depth of 30-100 m (1). Data on its biology are scarce (2-3). This study provides data on the age, growth, length-weight relationship and maturity of the Adriatic sole off the SW coast of Sicily.

Materials and methods

A sample of 283 specimens was collected from the landings in the port of Selinunte (SW coast of Sicily), during 2002. All specimens were measured to half cm below and weighted to the nearest g. Otoliths were viewed through a binocular microscope under reflected light. They were read by two readers three times, results were compared and questionable readings discarded. A total of 230 pairs of otoliths were read. The Von Bertalanffy equation (4) was used to calculate growth parameters using the least square method. Moreover, the parameters of the weight-length relationship ($W = aL^b$) were estimated. For each fish, gonads were weighed and a macroscopic scale was used (5) to distinguish the maturity stages. The gonadosomatic index ($GSI = 100 \times (\text{gonad weight} / \text{somatic weight})$) was calculated.

Results and discussion

Although the landings of the artisanal fishery were monitored all year round, the Adriatic sole was caught only from March to July. The length frequency distribution showed that total length (TL) ranged between 132 and 223 mm, with females being larger than males ($\overline{TL}_{\text{females}} = 174$ mm, $SE = 1.57$; $\overline{TL}_{\text{males}} = 159$ mm, $SE = 1.18$). The result of Kolmogorov-Smirnov test showed significant differences in the length distribution between males and females, $D^*_{(0,01)} = 0.22 < D = 0.45$. As showed elsewhere (6), the weight-length relationship indicated a positive allometric growth for both sexes: $W = 2 \times 10^{-6} TL^{3.269}$ ($R^2 = 0.92$) and $W = 8 \times 10^{-6} TL^{3.011}$ ($R^2 = 0.86$) for females and males, respectively. The growth parameters were $L_{\infty} = 223.81$ mm, $K = 0.25$ yr⁻¹, $t_0 = -3.14$ yr ($R^2 = 0.81$) for males and $L_{\infty} = 234.62$ mm, $K = 0.29$ yr⁻¹, $t_0 = -2.39$ yr ($R^2 = 0.90$) for females. All specimens caught were at the maximum maturity stage (IV) and GSI values followed a similar pattern for both sexes being higher in April-June ($GSI_{\text{march}} = 3.12$ $SE = 0.53$; $GSI_{\text{april}} = 4.46$ $SE = 0.54$; $GSI_{\text{may}} = 4.39$ $SE = 0.35$; $GSI_{\text{june}} = 4.04$ $SE = 0.46$; $GSI_{\text{july}} = 1.11$ $SE = 3.46$). This indicates a prolonged spawning season, as also shown in other studies (7).

The growth parameters of Adriatic sole in the south-west coast of Sicily were smaller than those estimated off the west coast of Brittany (8). Such a difference could be directly or indirectly related to the environmental conditions as well as fishing intensity in the two areas. It must be pointed out that juveniles (0 age group) were not caught in the waters off SW Sicily.

The results of our investigation on the biology of Adriatic sole, the lack of juveniles in our sample and of catches in cold seasons, allow to formulate the following hypotheses: (a) the sandy bottoms with a depth of 5-20 m, where the artisanal fishery works, are the spawning area for Adriatic sole; (b) The return in the shallow water of the mature Adriatic sole at the beginning of the spawning period, shows that inshore movement exists.

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