

POPULATION STRUCTURE OF ANNULAR SEA BREAM, *DIPLODUS ANNULARIS* L., IN THE EASTERN ADRIATIC SEA

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Abstract

The total length of 1872 individuals of *Diplodus annularis* ranged from 3.3 to 20.0 cm. Maximum age was 13 yr and the 5-yr old individuals dominated the catches (24.75%). The parameters of the von Bertalanffy growth equation were: $L_{\infty} = 22.6$ cm, $K = 0.173$ yr⁻¹ and $t_0 = -1.460$ yr. The overall male: female ratio was 1:1.12.

Keywords: *Diplodus annularis*, growth, Adriatic

Introduction

Annular sea bream *Diplodus annularis* is a demersal marine fish found in groups in sandy bottoms and seagrass bed habitats, at depths ranging from 0 to 50 m. It is distributed from the Gulf of Biscay to Gibraltar, around Madeira and Canary Islands, as well as in the Mediterranean, Black and Adriatic Seas (1). Although, it is common in the Adriatic Sea, there is a lack of data on its biology and ecology in this area.

Material and methods

Samples were collected on monthly basis (2000-2002), in the eastern Adriatic Sea, from commercial catches (trawl: 20 mm mesh size, knot-to-knot; beach seines: 6 mm mesh size). Overall 1874 specimens were collected of which 1694 (90.0%) were mature. Age was determined by reading scales from 699 individuals caught in May (91 juveniles and 608 adults). The non-linear least square regression procedure was used to estimate the growth parameters L_{∞} , K and t_0 of the von Bertalanffy equation (2).

Results and discussion

A total of 1872 specimens were analyzed, ranging in size from 3.3 to 20.0 cm total length TL (mean 12.38 ± 2.532 cm), of which 799 (42.68%) were males and 895 (47.81%) females. Males ranged in size from 8.7 to 20.0 cm TL (mean 13.11 ± 1.744 cm) and females from 7.5 to 19.6 cm TL (mean 12.75 ± 1.943 cm). The TL frequency distribution exhibited a mode at 12-14 cm. An increase in TL from NW to SE, and from the coastal zone to the open sea was observed. There is no previous data on the length structure of *D. annularis* population in the study area.

Maximum age was 13 yr (for a female individual). The oldest male was 11 yr old. The estimated von Bertalanffy growth parameters were: $L_{\infty} = 22.6$ cm (SE = 0.054), $K = 0.173$ yr⁻¹ (SE = 0.003) and $t_0 = -1.460$ yr (SE = 0.015) ($R^2 = 0.890$) (Fig. 1). Overall, the 5-yr old individuals, with lengths 11.3-17.8 cm TL, dominated (24.75%) the catches. Our results differ from those from Canary Islands (3), due to faster growth and shorter life cycle of *D. annularis* in that area (maximum age of 6 yr, $L_{\infty} = 24.85$ cm, $K = 0.259$ yr⁻¹ and $t_0 = -0.871$ yr).

In the eastern Adriatic Sea the overall male (799) to female (894) ratio of *D. annularis* was 1:1.12 and changed according to length classes (Fig. 2). This species is a rudimentary hermaphrodite (4) and observed sex ratio is a consequence of this fact. It is evident that in length range from 10.0 to 16.0 cm TL, males and females had similar

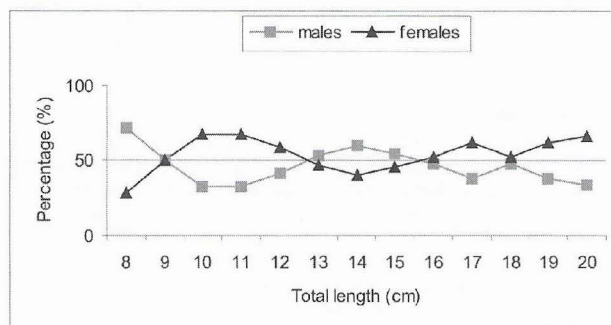


Fig. 2. Sex ratio of *Diplodus annularis* in the eastern Adriatic Sea.

distributions. Predominance of males in lower length classes (<9.0 cm) is mainly determined by nature of the sexual change, namely protandric hermaphroditism, as it was reported for *D. annularis* from Canary Islands (5).

References

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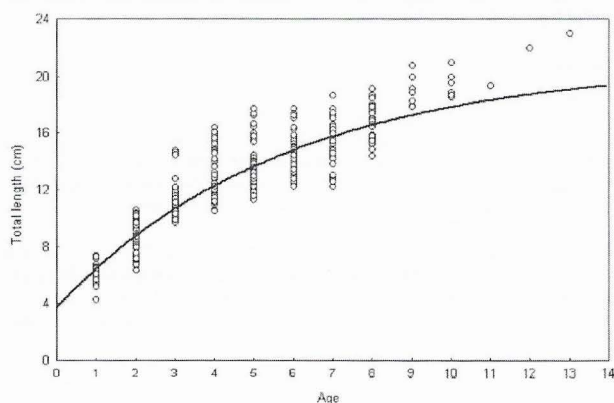


Fig. 1. von Bertalanffy growth curve of *Diplodus annularis* in the eastern Adriatic Sea.