LENGTH-WEIGHT RELATIONSHIP AND BIOMETRY OF SPRAT, *SPRATTUS SPRATTUS* (LINNAEUS, 1758), IN THE ZRMANJA RIVER ESTUARY (EASTERN ADRIATIC)

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Abstract

A total of 270 specimens of sprat, *Sprattus sprattus* (Linnaeus, 1758), were collected with purse seines from the Zrmanja River estuary (Novigrad Sea) during August 2000 -September 2002. Total length (*TL*) and weight (*W*) ranged from 7.7 to 15.0 cm and 4.03 to 23.05 g, respectively. The estimated length-weight relationship revealed allometric (*b*=2.654) growth.

Keywords: Sprattus sprattus, morphometry, meristic characters, Adriatic Sea

Introduction

Sprat, *Sprattus sprattus* (Linnaeus, 1758), is distributed in costal waters of the eastern Atlantic, the northern Mediterranean and the North Adriatic Sea (1). It is supposed that two subpopulations of sprat are present in the Adriatic Sea (2), based on differences in their morphometry and migrations. In this paper some biometrical parameters of sprat caught in the area of Zrmanja River estuary (Novigrad Sea) are presented.

Materials and Methods

Sprat specimens were caught as by-catch species of purse seiners together with sardine as target species in the Zrmanja River estuary area (Novigrad Sea) from August 2000 to September 2002. The Zrmanja River (69 km long) mouth is located in the central, northern coast of the Novigrad Sea area, forming a highly stratified estuary. All samples were taken at the same location – near the mouth of the Zrmanja River estuary (44°15'N; 15°30'E). All specimens caught were analysed because this species, which was very abundant in this area until 1986, was absent during 1987-1999 and started to appear in August 2000.

Length-weight relationship ($W=aL^b$) was calculated based on 270 specimens whereas six morphometric (total length – *TL*, standard length – *SL*, fork length – *FL*, head length – *HL*, maximum body height – *H* and eye diameter – *Ee*) and five meristic characters (number of rays in dorsal /*D*/, pectoral /*P*/, ventral /*V*/ and anal /*A*/ fins and number of vertebrae /*Vert.*/) were measured in 33 individuals. All lengths were measured to the nearest mm and weighed to the nearest g. Student's *t*-test was used to compare the estimated *b* value with the theoretical value 3 for isometric growth. Fish robustness was determined using Fulton's condition factor (*K*).

Results

The total length of all analysed specimens ranged from 7.7 to 15.0 cm (9.9 ± 1.1 cm, mean ± *SD*) and weight from 4.03 to 23.05 g (7.60 ± 3.45 g, mean ± *SD*). The morphometric and meristic characters of the 33 are presented in Table 1.

Table 1. Morphometric and meristic characters of 33 sprat specimens caught in the area of the Zrmanja River estuary, August 2000-September 2002.

Characters	Range (min –max, cm)	Mean ± *SD*
Morphometric:		
Total length (*TL*)	9.4–10.5	9.86±0.29
Standard length (*SL*)	8.0–9.2	8.38±0.28
Fork length (*FL*)	8.5–9.8	8.99±0.31
Head length (*HL*)	1.79–2.10	1.94±0.09
Maximum body height (*H*)	1.60–1.98	1.82±0.08
Eye diameter (*Ee*)	0.45–0.55	0.50±0.03
Meristic:		
Number of rays in dorsal fin (*D*)	15-18	16.5±0.71
Number of rays in pectoral fin (*P*)	16-17	16.7±0.45
Number of rays in ventral fin (*V*)	7	7.0±0.00
Number of rays in anal fin (*A*)	16-18	17.4±0.66
Number of vertebrates (*Vert*)	44-48	46.42±0.83

Obtained length-length relationships (*SL/LT, FL/LT, HL/TL, H/TL*) changed significantly (P=0.05) with increase of total length. The only published data we can compare is the data of the vertebrae number (*Vert.*) and portion of head length into total length of this species (3). The other results presented in this paper are the first for this species in the Adriatic Sea. The comparison of the mean vertebrae number (*Vert.*) from this study (46.42±0.83) with that of Zavodnik (3) (47.43±0.11) as well as portion of head length in total sprat length (*%HL*=19.633±0.88 and 18.08±1.03, respectively) indicated significant differences (t-test, P<0.05) between Novigrad Sea and North Adriatic (3).

The length-weight relationship was $W = 0.0168LT^{2.654}$ (n=270, r^2=0.811, SE of slope = 0.003). The slope (*b*=2.654) differed significantly from 3 (*t*-test=4.427, P<0.05), indicating negative allometry.

Fulton's condition factor ranged from 1.108 (length class 7.5 cm) to 0.006 (length class 15.0 cm) with a mean value of 0.769, indicating that smaller individuals were more robust than larger ones.

Reference

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