

Biometric characteristics of the blackspot seabream, *Pagellus bogaraveo* (Brunnich, 1769) (Osteichthyes: Sparidae) from the eastern Adriatic Sea

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Abstract: A biometric analysis was performed on a sample of 420 specimens of the blackspot seabream, *Pagellus bogaraveo* (Brunnich, 1769), from the eastern Adriatic Sea. The total length of all specimens ranged from 9.2 to 47.8 cm (23.70 ± 7.63 cm). Eighteen morphometric and eight meristic characteristics were determined. There were no statistically significant differences between the sexes in the morphometric and meristic characteristics of the blackspot seabream in the Adriatic Sea. Regarding meristic characteristics, there are no significant morphological differences between the blackspot seabream population in the Adriatic Sea and that in other areas of the Mediterranean Sea and the eastern Atlantic Ocean. Relative growth was studied by comparing changes in morphological characteristics with growth in total length and head length. The results indicate the presence of a single population of *P. bogaraveo* in the Adriatic Sea.

Keywords: *Pagellus bogaraveo*; Adriatic Sea; biometry; morphology; meristics

Sažetak: BIOMETRIJSKE OSOBINE RUMENCA OKANA, *PAGELLUS BOGARAVEO* (BRUNNICH, 1769) (OSTEICHTHYES: SPARIDAE) U ISTOČNOM DIJELU JADRANA. Provedena je biometrijska analiza na uzorku od 420 jedinki vrste rumenac okan, *Pagellus bogaraveo* (Brunnich, 1769) iz istočnog Jadrana. Ukupna dužina svih jedinki bila je u rasponu od 9,16 do 47,8 cm ($23,70 \pm 7,63$ cm). Određeno je osamnaest morfometrijskih i osam merističkih karakteristika. Nisu utvrđene statistički značajne razlike između spolova u morfometrijskim i merističkim karakteristikama rumenca okana u Jadranskom moru. Opcenito, prema merističkim karakteristikama, nema značajnijih morfoloških razlika između populacije rumenca okana iz Jadranskog mora i ostalih područja Sredozemlja i istočnog Atlantika. Relativni rast analiziran je usporedbom promjena morfoloških karakteristika s rastom standardne dužine ili dužine glave. Rezultati ukazuju na postojanje jedne populacije vrste *P. bogaraveo* u Jadranskom moru.

Cljučne riječi: *Pagellus bogaraveo*; Jadransko more; biometrija; morfologija; meristika

INTRODUCTION

The blackspot seabream, *Pagellus bogaraveo* (Brunnich, 1769), is a sparid fish common in the eastern Atlantic Ocean, from the southern part of Norway to Cape Blanc, Madeira, the Canary Islands, and the central and western Mediterranean Sea (Bauchot and Hureau, 1986). It is a benthopelagic species that lives over rocky, sandy, and silty bottoms up to 400 m in the Mediterranean and 700 m in the Atlantic (Bauchot and Hureau, 1986; Morato *et al.*, 2001). Juveniles live near the coast, on rocky and coralligenous bottoms, while adults live in deeper areas, not shallower than 60 m, suggesting ontogenetic migration to deeper waters (Morato *et al.*, 2001; Spedicato *et al.*, 2002). In the Adriatic Sea, the blackspot seabream is distributed mainly in the central and southern parts (Jardas *et al.*, 1981) (Županović and Jardas, 1989) (Piccinetti *et al.*, 2012). The highest abundance of *P. bogaraveo* was found in the shallow waters of the eastern Adriatic (Piccinetti *et al.*, 2012).

According to Dulčić and Kovačić (2020), the status of *Pagellus bogaraveo* in the Adriatic Sea was considered to be of least concern (LC). The blackspot seabream is known as a protandric hermaphroditic species (Krug, 1990) and grows up to 80 cm in length (Bauchot and Hureau, 1986). It has its economic importance in the Mediterranean (Bauchot and Hureau, 1986) and northeastern Atlantic (Caddy and Surette, 2005) and is mainly caught by trawls, traps, longlines, and hooks.

Data on the distribution, density, and size of the population in certain parts of the Mediterranean were examined by Spedicato *et al.* (2002). Some aspects of the biology of *P. bogaraveo* for Greek waters were described by Mytilineou and Papaconstantinou (1995). The reproduction of *P. bogaraveo* from the Ionian Sea was studied by Chilari *et al.* (2006), Krug (1990) for the Azores archipelago and from Spanish waters by Gil and Sobrino (2001). The diet of the black spot seabream was studied by Morato *et al.* (2001) for the Azores archipelago and by Polonio *et al.* (2008) for Spanish

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waters. Some characteristics such as the length-weight relationship (Mendes *et al.*, 2004) for the Mediterranean population and otolith morphology (D'Iglio *et al.*, 2021; Nikiforidou *et al.*, 2022) have also been studied. Age and growth of the blackspot seabream have been studied for the Azores archipelago by Krug (1989), for Spanish waters by Sobrino and Gil (2001), for Greek waters by Chilari *et al.* (2006), and for the Adriatic Sea by Paladin *et al.* (2023). Despite the economic importance of the black spot sea bream, aspects of its biology for the Adriatic Sea are still poorly known.

There is also little information in the literature about the morphological characteristics of the blackspot seabream, *i.e.*, morphometrics and meristics. Only for the Adriatic (Jardas, 1996), the Mediterranean (Tortonese, 1975; Bauchot and Hureau, 1986), and the Atlantic (Bauchot and Hureau, 1986; Muus and Nielsen, 1999) are some data on the basic meristic characteristics of the blackspot seabream described. Knowledge of morphometric and meristic characters can be important for identifying and accurately describing species or populations. Differences in morphological parameters in different regions may indicate the diversity of populations of the same species (Masood *et al.*, 2022). The aim of this study was to analyze the morphometric and meristic characteristics of the blackspot seabream from the eastern Adriatic Sea, taking into account the sex of the specimens and the variations of these parameters in relation to growth.

MATERIAL AND METHODS

Sampling

Samples of the blackspot seabream for this study were obtained from commercial landings and catches of demersal longlines and beach seine "migavica" used in the eastern Adriatic Sea and were collected from October 2007 to August 2009. The research was carried out in the eastern part of the central and southern Adriatic Sea. Samples from the middle Adriatic were taken on the southern side of Murter Island, in Kornati Archipelago and Primošten, near Podgora, near Maslinica on the island of Šolta, on the southern side of Hvar, *i.e.* in

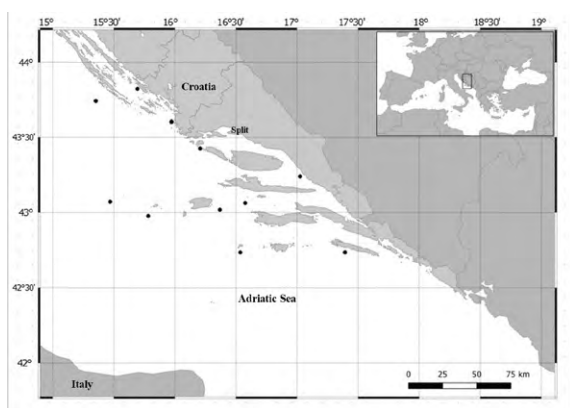


Fig. 1. Sampling locations of the black spot seabream, *Pagellus bogaraveo* in the eastern mid and south Adriatic Sea, Croatia, created in QGIS.

the Korčula Channel and in the channel between Vis and Vela Luka. Individuals from the open middle Adriatic area were caught in an area about 5-6 NM southwest of St. Andrija Island and about 6-7 NM northwest of the island of Jabuka and in the waters of the island of Sušac. The specimens caught in the southern Adriatic were from the island of Mljet and from the open southern Adriatic waters (Fig. 1).

Biometric analysis

The collected samples were analysed in the laboratory. Each fish was measured to the nearest 0.1 cm total length (TL) and weighed to the nearest 0.1 g (W). Sex and sexual maturity were determined by macroscopic and histological analysis of the gonads. Specimens were classified as male, female, hermaphrodite or immature. A total of 18 morphometric and eight meristic characters important for diagnosing the population of a species were measured. The morphometric characteristics analysed were as follows: total length (TL), standard length (SL), lengths of dorsal (LD) and anal fin base (LA), lengths of pectoral (LP), ventral (LV), and caudal fins (LC), predorsal (PD), preanal (PA), preventral (PV) and prepectoral (PP) distances, maximum (H) and minimum (h) body heights, head length (CL), eye diameter (O) and preocular (PO), interocular (IO) and postocular distance (OLO). The following meristic characteristics were analysed: number of dorsal (D), pectoral (P), ventral (V), anal (A), and caudal (C) fin rays, number of gill rakers (Brsp), number of scales in lateral line (L. Lat) and number of vertebrae (Vert) (Fig. 2). All measured morphometric characteristics were compared with the corresponding larger body size to obtain relative relations, expressed as percentages. The standard length was expressed as a percentage of the total length. The sizes measured on the head are expressed in relation to the head length, while all other body sizes are expressed in relation to the standard body length. The relationship between the smallest and largest body height is particularly pronounced.

Statistical analysis

Biometric data were analysed by calculating arithmetic means, standard deviations, and coefficients of variability. The normality of the distribution was tested by the two-sample Kolmogorov-Smirnov test ($p < 0.01$). Considering that the data follow a normal distribution, the parametric Student's t-test ($p < 0.05$) was used to compare the mean values of the morphometric characteristics of males and females, to detect possible sexual dimorphism in physical characteristics. In order to compare growth, length-length relationships were established using linear regression analysis with the equation $Y = a + bX$, where the total length (TL) is the independent variable (X), morphometric relationship dependent variable (Y), b is the coefficient of the linear regression. If the value of the coefficient $b \neq 0$, the analyzed morphometric relationship changes with the length of the fish (increases if $b > 0$, or decreases if $b < 0$).

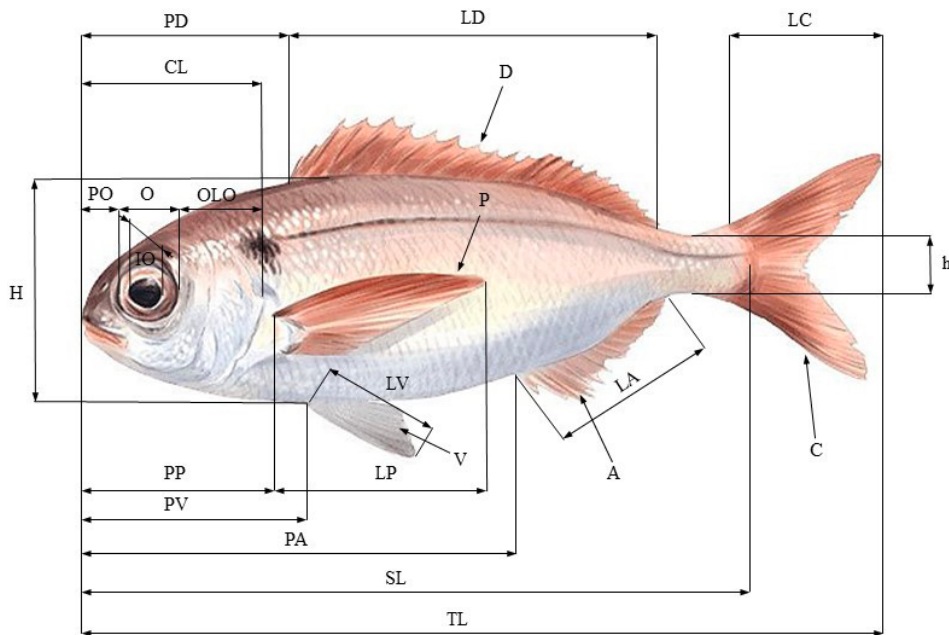


Fig. 2. Schematic representation of morphometric and meristic characteristics of the black spot seabream, *Pagellus bogaraveo*. Total length (TL), standard length (SL), lengths of dorsal (LD) and anal fin base (LA), lengths of pectoral (LP), ventral (LV), and caudal fins (LC), predorsal (PD), preanal (PA), preventral (PV) and prepectoral (PP) distances, maximum (H) and minimum (h) body heights, head length (CL), eye diameter (O) and preocular (PO), interocular (IO) and postocular distance (OLO), number of rays in dorsal (D), pectoral (P), ventral (V), anal (A), and caudal (C) fins (The original source: <https://shorturl.at/pwKQ8>; Adaptation by the authors, 2023).

0). The coefficient of determination (R^2) was used as an indicator of the quality of the linear regression.

RESULTS

In this study, 420 specimens of *P. bogaraveo* were examined for morphometric and meristic characters. Of these, 182 were females (43.3%), 120 were males (28.6%), 64 were hermaphrodites (15.2%), and 54 were immature specimens (12.9%). The total body length of all specimens ranged from 9.2 cm to 47.8 cm (23.70 ± 7.63 cm). The length of females ranged from 22.8 to 47.8 cm (32.48 ± 4.49 cm), males from 18 to 41.2 cm (23.97 ± 4.09 cm), hermaphrodites from 24.4 to 32.5 cm (28.74 ± 1.83 cm), and immature specimens from 9.2 to 20 cm (14.62 ± 3.50 cm). There were no statistically significant differences between the sexes in any of the eighteen morphometric characteristics ($p \geq 0.05$). Coefficients of variability ranged from 0.28% (h/H) to 17.53% (PO/CL). The range of all morphometric measurements for the total sample, including hermaphrodites and immature specimens, arithmetic mean, standard deviation, t-value, and coefficients of variability are presented in Table 1 and Table 2.

There were no statistically significant differences between the sexes for any of the meristic characteristics. The highest value of the coefficient of variability was observed in the number of scales in the lateral line. In all specimens, the ventral fin consisted of one spine and five soft rays, the spine had 25 vertebrae, while other meristic properties showed slight variation among

specimens. Data on meristic characteristics are presented in Table 3.

The coefficients of the linear regression show that bigger specimens of *P. bogaraveo* have a relatively larger head length ($b = + 0.448$, $R^2 = 0.315$), predorsal fin distance ($b = + 0.025$, $R^2 = 0.006$), preanal fin distance ($b = + 0.203$, $R^2 = 0.274$), prepectoral fin distance ($b = + 0.020$, $R^2 = 0.005$), dorsal fin base ($b = + 0.085$, $R^2 = 0.044$), ventral fin length ($b = + 0.052$, $R^2 = 0.088$), pectoral fin length ($b = + 0.158$, $R^2 = 0.252$) and caudal fin length ($b = + 0.120$, $R^2 = 0.087$). Preventral distance ($b = - 0.054$, $R^2 = 0.023$), and length of the anal fin base ($b = - 0.050$, $R^2 = 0.035$) are relatively shorter in bigger specimens than in individuals with smaller body lengths. Smaller eye diameters ($b = - 0.107$, $R^2 = 0.077$) and preocular distances ($b = - 0.020$, $R^2 = 0.001$) were also observed in bigger specimens, while interocular ($b = + 0.125$, $R^2 = 0.093$) and postocular distances ($b = + 0.061$, $R^2 = 0.015$) are larger in larger specimens.

DISCUSSION

This study provided the first data on the morphometric characteristics and complete meristic characteristics of the blackspot seabream, *Pagellus bogaraveo* in the Adriatic Sea. Analysis of meristic and morphometric variations between male and female fishes of a particular species could be considered a valuable tool in determining sexual dimorphism (Adarsh and James, 2016). This study revealed that there are no statistically significant differences in morphometric and meristic char-

Table 1. Relationships of morphometric characteristics (%) for males (N = 182), females (N = 120), and total sample (N = 420) of the blackspot seabream, *Pagellus bogaraveo* from the eastern Adriatic Sea to TL and SL. SD - standard deviation; V - variability coefficient.

Relationship*	Sex	Range (% , mm)	Mean \pm SD (mm)	t-value	V (%)
SL/TL	♂	77.22 – 88.15	82.20 \pm 2.48	1.26	6.17
	♀	78.37 – 84.88	81.33 \pm 1.19		1.43
	Total	76.15 – 88.48	81.61 \pm 2.06		4.23
CL/SL	♂	24.83 – 36.44	29.16 \pm 2.37	1.40	5.60
	♀	23.90 – 34.00	29.72 \pm 1.77		3.13
	Total	21.50 – 36.44	29.35 \pm 2.20		4.82
LD/SL	♂	32.57 – 54.91	48.21 \pm 3.29	0.69	10.80
	♀	43.82 – 54.03	47.83 \pm 2.41		5.79
	Total	32.57 – 60.63	47.69 \pm 3.11		9.64
LA/SL	♂	13.89 – 24.81	18.34 \pm 2.25	1.66	5.05
	♀	13.52 – 24.73	17.27 \pm 2.05		4.20
	Total	13.52 – 24.81	18.04 \pm 2.07		4.30
LP/SL	♂	18.90 – 35.26	31.08 \pm 2.37	1.37	5.61
	♀	24.02 – 35.19	31.66 \pm 2.14		4.56
	Total	18.90 – 36.26	30.64 \pm 2.42		5.84
LV/SL	♂	15.64 – 22.15	18.85 \pm 1.43	1.24	2.03
	♀	16.75 – 21.01	19.37 \pm 0.96		0.93
	Total	15.44 – 31.31	19.01 \pm 1.53		2.33
LC/SL	♂	17.89 – 33.72	25.38 \pm 3.42	1.09	11.72
	♀	22.77 – 35.56	26.58 \pm 2.42		5.83
	Total	17.16 – 38.21	25.69 \pm 3.25		10.53
PD/SL	♂	26.51 – 39.51	32.01 \pm 2.80	0.59	7.81
	♀	24.48 – 35.13	31.74 \pm 1.79		3.20
	Total	24.10 – 39.51	31.62 \pm 2.42		5.87
PA/SL	♂	54.65 – 70.76	62.25 \pm 2.67	1.55	7.14
	♀	58.85 – 67.72	62.94 \pm 1.90		3.59
	Total	50.60 – 70.76	61.17 \pm 2.97		8.84
PP/SL	♂	25.43 – 37.72	30.84 \pm 2.63	0.98	6.93
	♀	24.03 – 34.20	31.28 \pm 1.98		3.93
	Total	24.03 – 37.72	31.00 \pm 2.20		4.85
PV/SL	♂	26.39 – 39.12	32.51 \pm 3.13	1.57	9.77
	♀	25.10 – 36.80	33.34 \pm 2.33		5.44
	Total	19.15 – 39.12	32.75 \pm 2.73		7.46
H/SL	♂	28.84 – 41.85	36.46 \pm 2.16	1.37	4.67
	♀	25.56 – 39.66	35.91 \pm 2.59		6.73
	Total	25.56 – 41.85	35.34 \pm 2.68		7.20
h/SL	♂	7.74 – 10.49	8.67 \pm 0.48	1.48	0.23
	♀	7.64 – 9.55	8.43 \pm 0.46		0.21
	Total	6.68 – 10.49	8.55 \pm 0.53		0.28

* abbreviations as in Fig. 2, **statistically significant ($t \geq 1.96$; $p \leq 0.05$)

Table 2. Relationships of morphometric characteristics (%) for males (N = 182), females (N = 120), and total sample (N = 420) of the blackspot seabream, *Pagellus bogaraveo* from the eastern Adriatic Sea to CL and H. SD - standard deviation; V - variability coefficient.

Relationship*	Sex	Range (% , mm)	Mean \pm SD (mm)	t-value	V (%)
O/CL	♂	29.01 - 43.41	36.00 \pm 2.91	1.61	8.48
	♀	27.75 - 43.17	34.04 \pm 3.05		9.33
	Total	24.86 - 43.41	35.25 \pm 2.94		8.63
IO/CL	♂	23.86 - 38.29	31.13 \pm 3.42	1.87	11.70
	♀	26.73 - 38.92	32.07 \pm 2.78		9.71
	Total	22.55 - 38.94	30.60 \pm 3.19		10.15
PO/CL	♂	15.06 - 33.89	23.65 \pm 4.45	1.69	19.77
	♀	16.23 - 31.27	22.35 \pm 3.73		13.94
	Total	13.71 - 39.38	23.25 \pm 4.19		17.53
OLO/CL	♂	33.87 - 56.15	45.28 \pm 4.65	0.30	21.64
	♀	38.24 - 52.48	45.05 \pm 3.06		9.37
	Total	33.87 - 56.15	44.88 \pm 3.88		15.06
h/H	♂	20.52 - 31.19	23.84 \pm 1.55	0.69	2.44
	♀	20.39 - 33.54	23.59 \pm 2.19		4.80
	Total	20.00 - 33.54	24.28 \pm 2.13		4.44

* abbreviations as in Fig. 2, **statistically significant ($t \geq 1.96$; $p \leq 0.05$)

Table 3. Meristic characteristics for males (N = 182) and females (N = 120) of the blackspot seabream, *Pagellus bogaraveo* from the eastern Adriatic Sea. SD - standard deviation; V - variability coefficient.

Meristic characteristics	Sex	Range	Mean \pm SD	t	V(%)
Number of rays in the dorsal fin (D)	♂	XII/11 - 13	24 \pm 0.28	0.33	0.08
	♀	XII/11 - 13, XIII/11	24 \pm 0.41		0.17
Number of rays in the anal fin (A)	♂	III/11 - 13	21.96 \pm 0.33	0.21	0.10
	♀	III/11 - 13	21.97 \pm 0.35		0.12
Number of rays in the pectoral fin (P)	♂	16 - 17	16.26 \pm 0.46	0.32	0.19
	♀	16 - 17	16.26 \pm 0.46		0.21
Number of rays in the ventral fin (V)	♂	I/5	5.00 \pm 0	0	0
	♀	I/5	5.00 \pm 0		0
Number of rays in the caudal fin (C)	♂	23 - 26	24.84 \pm 0.33	0.74	3.42
	♀	23 - 26	24.86 \pm 0.35		4.23
Number of the gill rakers (Brsp)	♂	29 - 32	30.41 \pm 0.28	0.67	3.12
	♀	29 - 32	30.43 \pm 0.23		2.92
Number of vertebrae (Vert)	♂	25	25.00 \pm 0	0	0
	♀	25	25.00 \pm 0		0
Number of the scales in the lateral line (L. Lat)	♂	63 - 80	74.73 \pm 2.98	0.79	4.32
	♀	63 - 80	73.08 \pm 4.17		3.74

acteristics between the sexes of the blackspot seabream from the Adriatic Sea. Only minor differences (t-test; $p > 0.05$) were found between all male and female fish morphometric characteristics. The meristic characteristics of the males and females of this species are also in agreement, as shown in Table 3. Thus, no sexual dimorphism was detected in this species. This could be related to the fact that this species is characterized by protandric hermaphroditism, i.e. the same individuals appear first as males and later as females. In the axillary seabream, *Pagellus acarne*, from the eastern Adriatic, which is

also a protandrous hermaphrodite, no differences were found between the sexes in any of the morphometric characters (Dragičević *et al.*, 2012).

The high values of coefficients of variability ($> 10\%$) were found for morphometric characteristics which relate to head length (PO, IO, OLO), and length of caudal fins relate to standard length (LC). The relatively low values of the coefficients of variability ($< 10\%$) for other measurements indicate that there were no morphological differences among the collected specimens and that variation within populations is minimal

Table 4. Meristic characteristics of the blackspot seabream, *Pagellus bogaraveo* from the Adriatic Sea, Mediterranean Sea, and Atlantic Ocean.

Area	Adriatic Sea	Adriatic Sea	Italian coast	East Atlantic and Mediterranean	Atlantic
Author	This study	Jardas (1996)	Tortonese (1975)	Bauchot and Hureau (1986)	Muus and Nielsen (1999)
Number of rays in the dorsal fin (D)	XII/XIII+11-13	XII/XIII+11-14	XII+12-14	XII/XIII+11-13	XII/XIII+11-13
Number of rays in the anal fin (A)	III+11 - 13	III+11 - 13	III+12 - 13	III+11 - 12	III+11 - 12
Number of rays in the ventral fin (V)	I + 5	I + 5	-	I + 5	-
Number of rays in the pectoral fin (P)	16 - 17	16 - 17	-	-	-
Number of rays in the caudal fin (C)	23 - 26	-	-	-	-
Number of vertebrae (Vert)	25	-	-	-	-
Number of the gill rakers (Brsp)	29 - 33	-	16 - 18	29 - 32	-
Number of the scales in the lateral line (L. Lat)	63 - 80	60 - 67	60 - 67	68 - 74	-

or very small. Values of the coefficient of variability within populations are usually well above 10% for fish (Carvalho, 1993). Dragičević *et al.* (2012) also found a higher coefficient of variability for the PO /CL relation for *P. acarne*.

Based on the results of morphometric analysis of the blackspot seabream from the Adriatic Sea, there is no tendency for bimodality of morphological characteristics, which indicates the presence of a homogeneous population in the area of the eastern Adriatic Sea and excludes the presence of subpopulations. Palma and Andrade (2004) published data on morphometric characteristics for four countries along the South European Atlantic coast (Portugal) and the Mediterranean Sea (Spain, Italy and Greece) but the data are not comparable with data from this study. In their study, collected fish were X-rayed, and multivariate statistical analysis was used to discriminate populations, based on 14 adjusted morphometric characters. Although, they determined significant morphological differences between samples from different areas and a clear difference between Atlantic and Mediterranean samples.

A few publications describe only the basic meristic characteristics of blackspot seabream from the Adriatic (Jardas, 1996), Italian coast (Tortonese, 1975), Mediterranean and Atlantic (Bauchot and Hureau, 1986), and Atlantic (Muus and Nielsen, 1999). The meristic characteristics of blackspot seabream from the eastern Adriatic Sea are largely consistent with data from other areas (Table 4). The meristic characteristics, the number of rays in the ventral fin (I+5) is the same in all areas of the blackspot seabream, as well as the number of spined rays of the anal fin (III), while the number of soft rays ranges from 11 to 13, being the greatest in the Adriatic. The number of spined rays in the dorsal fin (XII / XIII) was the same in all areas, except on the Italian coast, where there were XII (Tortonese, 1975). The number of soft rays in the dorsal fin ranged from 11 to 14, but most frequently between 11 and 13 as in

this study. The number of soft rays in the pectoral fin ranged between 16 and 17 and in the caudal fin ranged from 23 to 26 in this study. This is not comparable to studies from other seas because there is no data for these two meristic characteristics. The number of soft rays in the pectoral fin confirmed previous results for the Adriatic Sea (Jardas, 1996). According to Bauchot and Hureau (1986), the number of scales in the lateral line varies between 68 and 74 for the blackspot seabream population in the Atlantic and Mediterranean Seas and between 60 and 67 for the Italian coast according to Tortonese (1975). In this study, the number of scales in the lateral line is much greater, varying from 63 to 80. This greater variation is likely due to a larger sample size of the blackspot seabream examined in this study. The number of branchiospines in this study varied between 29 and 33, which is almost identical to the Atlantic and is significantly different on the Italian coasts, where it is the lowest (16-18) and apparently has a number of gill rakers only in the lower or upper part. It has long been known that meristic characteristics, particularly the number of vertebrae, in many fishes are influenced by environmental factors such as temperature, salinity, oxygen concentration, and light during early development (Fowler, 1970). The number of vertebrae in the blackspot seabream in this study is 25, but there are no data on these meristic characteristics for the other areas. A comparison of the above data probably shows no pronounced meristic differences between populations of this species in the Adriatic Sea and other areas of the Mediterranean, including the Italian coast and the Atlantic Ocean. Such meristic peculiarities show that the populations are homogeneous and stable, considering the meristic parameters.

According to Chaklader *et al.* (2016), examining the linear regression relationships between the total body length of fish and several morphometric characters was the best indicator for determining the growth pattern of fish. Because no data on the relative growth of the

blackspot seabream can be found in the available literature, it is not possible to compare the results of this work and determine if there is a similar growth pattern for this species in different distribution areas. In this research low values of the coefficient of determination were obtained. Low values can be connected with a smaller number of sampled individuals, irregular distribution of samples by months and the range of total body length. These factors should be considered when interpreting R^2 values.

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