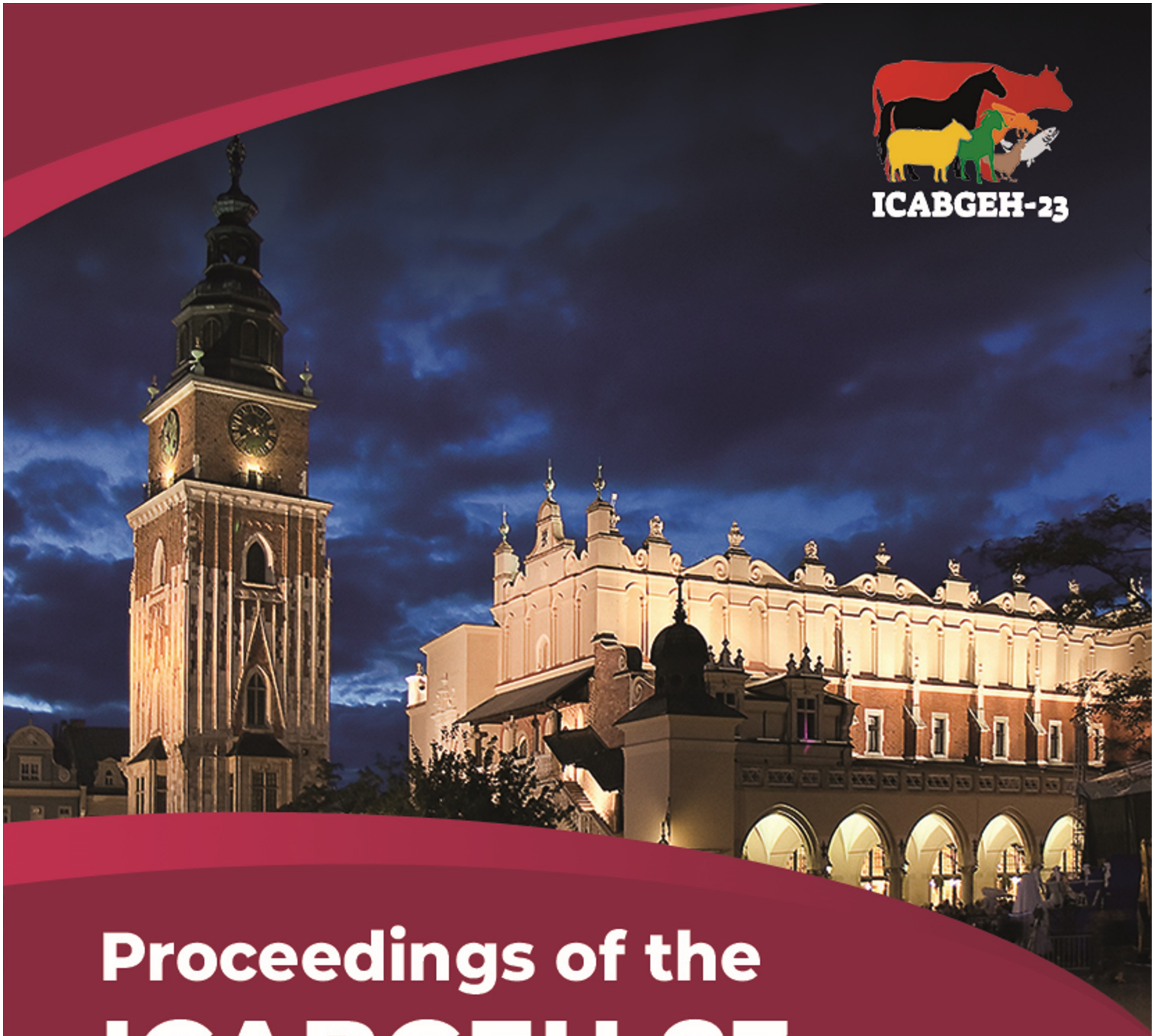


Proceedings of the ICABGEH-23

VII. International Congress on Domestic Animal Breeding,Genetics and Husbandry

September 18 - 20, 2023 in Krakow, POLAND

Editors:
Prof. Dr. Hasan ÖNDER
Assoc. Prof. Dr. Ugur SEN

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ISBN: 978-605-06447-3-9

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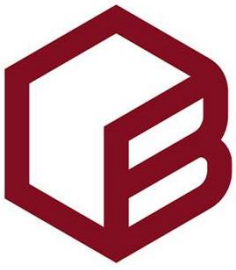
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Proceedings of the VII. International Congress on Domestic Animal Breeding Genetics and Husbandry 2023 "ICABGEH-23"

Publisher:

Black Sea Journals

E-Book Layout, Preparation and Composition:

Hasan ONDER, Ugur SEN, Hasan Alp SAHIN and Cem TIRINK

All published articles were peer-reviewed by Scientific Referee Committee

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REPRODUCTIVE BIOLOGY OF WHITE SEABREAM, *DIPLODUS SARGUS* FROM NORTHEASTERN AEGEAN SEA, TURKIYE

Ismail Burak DABAN, Ali ISMEN, Mukadder Arslan IHSANOGLU*

Canakkale Onsekiz Mart University, Faculty of Marine Science and Technology, Department of Fishereis and Fish Processing Technology, 17100, Canakkale, Turkiye.

*Presenter e-mail: mukadderarslan@gmail.com

Abstract

*White seabream Diplodus sargus (Linnaeus, 1758) is one of the economic and common species in the Northern Aegean Sea. And it has wide geographical distribution from Bay of Biscay to Angola in the Eastern Atlantic, and from Gibraltar to to Black Sea. This study indicated that the reprodcutive biology of Diplodus sargus, White seabream in the Northeastern Aegean Sea. The specimens were obtained by a small-scale fisherman between August 2020 and July 2021 around Northeastern coasts of Turkiye. Total of 322 specimens were analysed. It was determined that 143 female and 176 male individuals. The female:male ratio was calculated as 0.8:1.0. The length as first maturity (L_{50}) was determined as 22.69 cm for females, 25.2 cm for males, respectively. The GSI value was maximum in May and minimum was is August for females and maximum April and minimum in October for males. The mean total fecundity and the fecundity-length relationship equation was calculated as 64446±10505 and F=15001*TL-311254, respectively. It has been determined that the breeding season of White seabream takes place between February and June.*

Keywords: *First maturity length, Gonadosomatic index, Condition factor, Reproductive period, Diplodus sargus.*

INTRODUCTION

The population and reproductive characteristics of fish are key elements in the consideration and control of fisheries resources (Froese 2004). The components of reproductive biology such as first sexual maturity, spawning season, fecundity, condition factor and gonadosomatic index reveal an important indicator for the fisheries management authority. Without valuable data on these aspects, the implementation for controll become impossible. Under these conditions, so as many fish stocks, rapid collapses occur after overfishing. A knowledge on spawning season enable to determine fishery closures, which useful enforcement due to provide protective measures for spawning success (Yıldız and Ulman, 2020). Similarly, length and age at first sexual maturity is an essential information in order to determine minimum landing size, that give a chance to spawn at least one before fished (Froese et al., 2008).

There is a gap in the literature about reproduction parameters of Diplodus sargus. Only a few study indicetes first reproductive length and spawning season of the species (Mouine et al. 2012; Benchalel and Kara, 2012; Ayyıldız and Altın, 2020; Boufekane et al. 2021).

Therefore, this study is important as it presents the first findings of reproduction parameters (first sexual maturity length, reproductive season, fecundity) of *D. sargus* in the Northeastern Aegean Sea, Eastern Mediterranean.

MATERIALS AND METHODS

The specimens were obtained by a small-scale fisherman between August 2020 and July 2021 around Northeastern coasts of Turkey. A random sampling of minimum 30 individuals per month from different sizes were conducted from commercial catchs of handline and longline fishing gears for White Seabream and trammel nets for Salema. A total of 322 specimens of White Seabream was collected, respectively.

The total length (TL) were measured with measuring board to the nearest mm and total weight (TW) and gonad weight (GW) were weighted to the nearest 0.01 g. Sex and maturity stages were analysed macroscopically and maturity stages were determined according to five digit maturity scale of Holden and Raitt (1974).

Gibson and Ezzi's (1980) and King's (1995) formula were used for determining Gonadosomatic Index (GSI) and length at first maturity (L_{50}), respectively. For fecundity analyses, each pair of ovaries was dried and weighed. A subsample of 0.05 g from 3 parts (front, middle and back) were taken from each ovary. All samples were counted under a stereozoom microscope and the mean value was calculated. Absolute fecundity was calculated with Bagenal's formula (equation 1) (Bagenal 1978);

$$F = N \times (G/g) \quad (1)$$

where N is the mean number of eggs in each gonad, G is the total weight of gonad, and g is weight of the female individual. The total length-fecundity, the total weight-fecundity and age-fecundity relationship were estimated for females using linear and and exponential regression which equations best fit.

RESULTS

The gonadomomatic index and condition factor value monthly calculated for *D.sargus*. The GSI values were between 0.01-9.71 and the maximum GSI value was determined in February, minimum GSI value was determined in August for females. In male individuals the maximum GSI was in April, minimum GSI was in November (Figure 1).

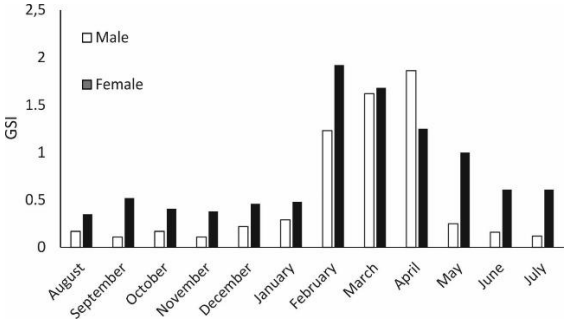


Figure1. Monthly GSI variation of *D.sargus*

The condition factor varies between 0.87 and 2.13 in all individuals. The minimum CF value was determined in November (1.47) and the maximum CF value in October (1.79) in all individuals.

The CF value in females varied between 0.87 and 2.10, the minimum CF value was determined in November and the maximum CF value was determined in October.

In males, CF varied between 1.18 and 2.15, the minimum was in November and the maximum was in October.

Although no significant difference could be detected between female and male CF values. The lengths at 50% maturity of *D.sarhus* were calculated as 22.69 cm in females and 25.2 cm in males.

The monthly sexual maturity stages (Figure 2), GSI and CF values were evaluated together the reproductive period of *D.sargus* was determined between February to June.

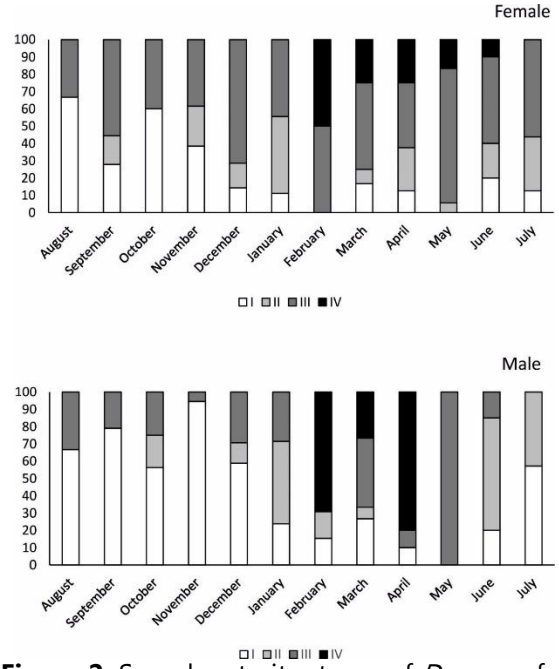


Figure 2. Sexual maturity stages of *D. sargus* for females and males.

The total fecundity and mean fecundity were calculated between 16914 to 112144 eggs, and 64446±10505. Fecundity length relationship equation were determined as F=15001*TL-311254 (r^2=0.87) (Figure 3).

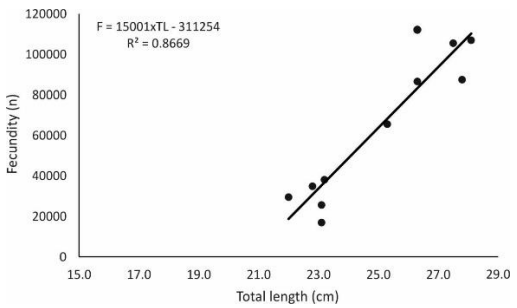


Figure 3. Fecundity – total length relationship of *D.sargus*

It was determined that the fecundity increased as the length increased. Fecundity weight relationship equation was calculated as F=461.99*TW-62486 (r^2=0.84) (Figure 4).

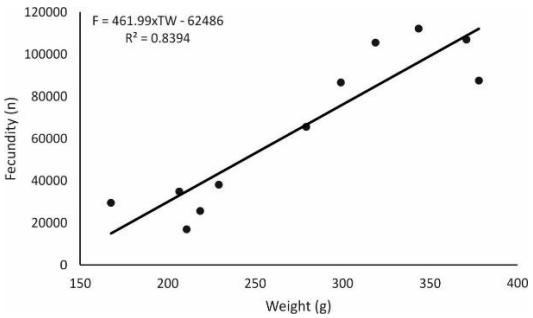


Figure 4. Fecundity – total weight relationship of *D.sargus*

DISCUSSION

Mouine et al. (2012) determined that the first sexual maturity length of *D.sargus* in the Gulf of Tunisia was 21 cm. Benchalel and Kara (2013) calculated that it was 20.2 cm in males and 20 cm in females in the eastern coast of Algeria. Boufekane et al., (2021) found that the reproductive season between January to May and spawning occurred in spring, and calculated the size at first sexual maturity (TL_{50}) was 20.55 cm for both sexes

In our study, L_{50} values were determined 22.69 cm TL in females and 25.2 cm TL in males. L_{50} values of females are similar with other studies, while L_{50} value of males is higher than the other studies. It is thought that this may be due to the smaller number of male individuals being sampled in other studies and the difference in catching power.

Ayyıldız and Altın (2020) investigated the growth and retrospective catching dates of *D.sargus* in the northern Aegean Sea at the juvenile stage. It was determined that reproduction took place between January and June and 3 breeding peaks were observed as March-April, February and May, although it varies according to the sampling regions. In this study, reproduction peaked between February and April. It was determined that the results of these two studies, which were carried out in the same region and whose reproductive period was determined by different methods, were parallel.

ACKNOWLEDGEMENTS

This study was supported by the Scientific Research Projects Commission of Canakkale Onsekiz Mart University with the project numbered FBA-2020-3295.

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Iran	5	4,55
Italy	2	1,82
Kazakhstan	6	5,45
Mexico	1	0,91
Nigeria	4	3,64
Pakistan	3	2,73
Philippines	1	0,91
Poland	22	20
South Africa	4	3,64
Türkiye	48	43,64
Ukraine	1	0,91
TOTAL	152	100