



SHORT COMMUNICATION

Record of the largest *Symphodus tinca* (Linnaeus, 1758) in the Black Sea coasts

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ARTICLE INFO

Article History:

Received: 26.09.2023

Received in revised form: 12.11.2023

Accepted: 12.11.2023

Available online: 25.12.2023

Keywords:

Labridae

Maximum size

Morphology

Türkiye

ABSTRACT

This study records a remarkable finding in the Black Sea, where *Symphodus tinca*, a rare wrasse species. On June 9, 2023, during a biodiversity survey near Fener Island (Fatsa, Ordu, Türkiye), a male *S. tinca* was captured at a depth of 12 meters, measuring 316.0 mm in length and weighing 430.43 g. This specimen represents the largest ever recorded in the Black Sea. The factors behind this extraordinary finding, likely a result of species-specific and site-specific conditions such as low competition, favorable environmental factors, suitable habitats, and low fishing pressure, are complex and multifaceted. This finding not only contributes crucial data to the understanding of *S. tinca* growth patterns but also holds significance for its conservation, ecosystem management, and scientific research.

Please cite this paper as follows:

Aydın, M., & Karadurmuş, U. (2023). Record of the largest *Symphodus tinca* (Linnaeus, 1758) in the Black Sea coasts. *Marine Science and Technology Bulletin*, 12(4), 505-509. <https://doi.org/10.33714/masteb.1366593>

Introduction

The Labridae family, is known for its extensive representation in the Atlanto-Mediterranean ichthyofauna, inhabits diverse marine environments across the globe, encompassing both tropical and temperate waters (Helfman et al., 2009). The Labridae family, represented by 21 species in Turkish territorial waters, and from them only eight ones spread on the Black Sea coasts (Bilecenoğlu et al., 2014; Karataş et al., 2021). *Symphodus tinca* (Linnaeus, 1758), commonly known as the East Atlantic peacock wrasse, exhibits a wide

distribution in both the eastern and western Mediterranean regions, as well as the Black Sea. Its ecological preferences are extensive, encompassing rocky reef ecosystems covered with algal communities and colonized seagrass meadows. Individuals display adaptability to a depth range spanning from shallow waters to considerably 50 m depths (Pollard, 2010). It lives a solitary or in small groups disposition and feeds on a broad dietary spectrum comprising crabs, shrimps, bivalves, sea-urchins, and ophiuroids (Ouannes-Ghorbel & Bouain, 2006). Adults adopt a benthic lifestyle, concentrating their reproductive activities within well-defined inshore spawning

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grounds. This species displays pronounced sexual dimorphism during the reproductive phase (Golani et al., 2006).

There are various studies on the biological and morphological aspects of *S. tinca* along the Turkish coast (Karakulak et al., 2006; İlhan et al., 2008; Cengiz, 2021). In contrast to its relatively well-documented presence in the Mediterranean and Adriatic regions (Jardas, 1996), *S. tinca* is the least common wrasse species in the Black Sea. This paucity of presence has engendered substantial lacunae in scientific knowledge, with previous research efforts in the Black Sea being notably sparse (Kasapoğlu et al., 2016; Onay, 2021). This study presents the record of the largest individual case of *S. tinca*, a rare wrasse species within the Black Sea. This substantial finding not only augments our comprehension of *S. tinca* but also underscores the exigency of further research endeavors to unravel the intricacies of the distinct marine ecosystem in the Black Sea.

Material and Method

The sample was collected during a biodiversity survey on June 9, 2023. The survey took place in the shallows of the southern part of Fener Island (41°03'32" N – 37°30'33" E), situated off the coast of Fatsa district in the Black Sea. Specimen was captured at a depth of 12 m using a commercial trammel net with a 44 mm mesh size. Species identification was carried out using (Quignard & Pras, 1986) taxonomic key specific to the Labridae. Additionally, the scientific name of the species was verified according to FishBase (Froese & Pauly, 2023). The total length (TL) of specimen was measured from the most forward point of the head, with the mouth closed to the farthest tip of the tail using a plexiglass ichthyometer with mm-level accuracy. Body weight (TW) was weighed individually using a digital scale with an accuracy of 0.01 g. To provide a detailed morphological description of the collected specimen, a set of 13 morphometrics were measured, detailed in Figure 1 according to Kasapoğlu et al. (2016). Morphological characters were taken with a Vernier caliper with a precision of 0.05 mm. Sex determination was made by considering the external morphology and coloration of the gonads (Sadovy de Mitcheson et al., 2010).

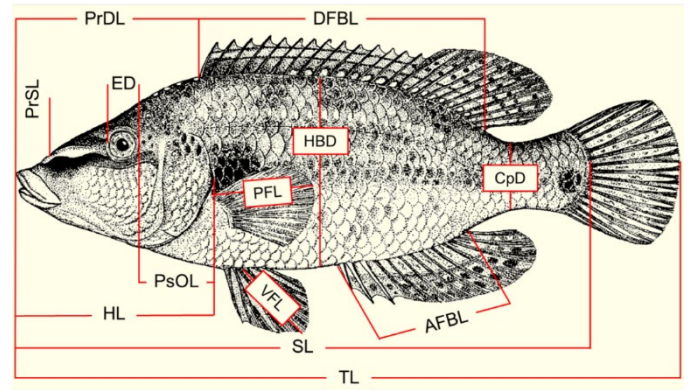


Figure 1. Morphological measurements: Total length (TL), standard length (SL), eye diameter (ED), head length (HL), caudal peduncle depth (CpD), highest body depth (HBD), dorsal fin base length (DFBL), ventral fin length (VFL), pectoral fin length (PFL), anal fin base length (AFBL), pre-snout length (PrSL), pre-dorsal length (PrDL), post-orbital length (PsOL). (The drawing was taken from Fischer et al. (1987) catalog book)

Results

A male *S. tinca* individual with a total length of 316.0 mm and a body weight of 430.43 g was obtained during the field studies (Figure 2). Detailed morphometric measurements specific to sample are presented in Table 1. These measurements provide a comprehensive overview of the physical characteristics of the collected specimen, facilitating a deeper understanding of their morphology and size. The external appearance of the specimen displayed distinct sex-related, the male sample exhibited a vibrant green-yellowish body coloration, complemented by sharp bluish spotting on the fins.



Figure 2. The male specimen of *Symphodus tinca* with 316.0 mm total length, captured from the Black Sea coast on June 9, 2023

Table 1. Morphometric measurements of male *Symphodus tinca*

Characters	Measures (mm)
TL	316.00
SL	253.00
ED	12.05
HL	88.15
Cpd	36.70
HBD	93.30
DFBL	128.00
VFL	151.90
PFL	50.15
AFBL	66.40
PrSL	36.00
PrDL	90.25
PsOL	33.75
Body weight (g)	430.43

Discussion

The largest individual of *S. tinca* ever known (TL=425.0 mm) was recorded in the Adriatic Sea (Pallaoro & Jardas, 2003). In Turkish territorial waters, the largest individuals, one female (TL=280.0 mm) and one male (TL=260.5 mm), were reported from the western coast of the Black Sea by Kasapoğlu et al. (2016). In this study, we report a male *S. tinca* individual, the largest known so far for the Black Sea. Considering the length-weight relationship based on preliminary parameter estimates by the previous scores given in Froese & Pauly (2023) ($n=16$, $a=0.0148$, $b=2.97$), the expected weights (421.05 g), a value close to our observed values (430.43 g), indicates that this specimen has grown almost following the previous estimated relationship.

The factors contributing to the discovery of such a large-sized individual in the study area, which are species- and site-specific, are multifaceted and complex. It's likely that suitable habitats and favorable environmental conditions play a significant role in the growth of individuals. Abundant nutrient concentration, suitable water temperature, oxygen levels, and other environmental factors can promote the availability of food resources and create an ideal environment for growth (Pauly, 1980; Gertseva et al., 2017; Volkoff & Rønnestad, 2020). The rarity of known predators of *S. tinca* in the region and reduced competition for resources in certain niches or habitats are plausible factors contributing to larger sizes. Lower predation and competition can allow individuals to allocate more energy and resources towards growth and survival (Hall & Kingsford, 2016). Wrasses are not targeted as target catches

in commercial fisheries. By being caught as bycatch and then discarded, it might have a higher chance of survival compared to species subject to intense fishing pressure. Large individuals of *S. tinca* are an attractive target in spearfishing and should be considered a negligible threat. The presence of shelf area dominated by steep rocky cliffs (Tezcan et al., 2016) and extensive artificial structures (road construction, land acquisition, and airport construction) on the Turkish coast of the Black Sea (Aydın, 2018) could offer protection for individuals, allowing them to survive and grow larger. The stable population and the "Least Concern" status of *S. tinca* in the International Union for Conservation of Nature Red List (Pollard, 2010) suggest that the species is not currently facing major threats. This status and our predictions align with established ecological principles, and they collectively contribute to a better understanding of why this individual *S. tinca* reached such a large size in the study area. Further research and sampling efforts will be essential to confirm all these hypotheses and provide more detailed insights into the growth patterns and ecological requirements of species.

This study contributes valuable data that can be directly incorporated into these models by providing a maximum size record for *S. tinca* in the Turkish coast of the Black Sea. Maximum size records are critical parameters in stock assessment models used in fisheries science (Shephard et al., 2020). Such records serve far-reaching implications, not only for understanding the growth patterns of *S. tinca* but also for its conservation, ecosystem management, and scientific contributions. This record can be cited and referenced by other researchers in future studies, further advancing the understanding of this species. One last note: The Black Sea, once marred by environmental degradation and overfishing, has witnessed a notable increase in maximum size records of various marine species in recent years (Aydın, 2018, 2021; Özdemir et al., 2019; Aydın & Karadurmuş, 2021; Karadurmuş et al., 2021). Although this phenomenon is intriguing, it may be indicative of a broader positive trend in the Black Sea marine ecosystems. It is recommended to make further studies that reveal potential factors—such as environmental conditions, species-specific adaptations, ecosystem rehabilitation, governance and conservation initiatives, and scientific advancements—and their consequences, which have a possible impact on the increase of such records in the Turkish coasts of the Black Sea.

Compliance With Ethical Standards

Authors' Contributions

MA: Conceptualization, Methodology, Investigation, Formal analysis, Writing - Review & Editing.

UK: Conceptualization, Investigation, Writing - Original Draft, Writing - Review & Editing, Visualization.

All author contributions are equal for the preparation research in the manuscript.

Conflict of Interest

The authors declare that there is no conflict of interest.

Ethical Approval

All applicable international, national, and institutional guidelines for the care and use of animals were followed. For this type of study, formal consent is not required.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author.

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