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A new distribution and confirmation record of *Thunnus obesus* in the Syrian coast (eastern Mediterranean Sea)

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ABSTRACT

A new occurrence documented *Thunnus obesus* on the Syrian coast (eastern Mediterranean Sea). The specimens measured 75-90 cm total length, 70-82 cm fork length, and weighed 8.5-10.5 kg. They were captured by artisanal fishermen off the coast of Ras al-Basit using a longline at 25 m depth, with a surface temperature of 22.9°C. The reappearance of *Thunnus obesus* suggests alterations in marine biodiversity. Monitoring these developments is essential to maintain an understanding of the regional ecosystem. These observations highlight the need for further research to gain a more comprehensive understanding of these emerging phenomena.

Keywords: Bigeye tuna, Ras al-Basit, Syrian coast, *Thunnus obesus*.

1. INTRODUCTION

The appearance and distribution of the *Thunnus obesus* in the Mediterranean Sea differ significantly compared to other Tuna species found in the region (Hamwi, 2024). The Bigeye tuna is a tropical and subtropical species, typically found in the open ocean areas of the Indian, Pacific, and Atlantic Oceans (Froese and Pauly, 2024). Its natural range does not usually extend into the Mediterranean Sea, which is considered a temperate region. In contrast, other tuna species, such as the *Thunnus thynnus* and *Thunnus alalunga* are much more common and widespread throughout the Mediterranean Sea (Collette and Nauen, 1983; Froese and Pauly, 2024). These tuna species are better adapted to the environmental conditions of the Mediterranean (Othman et al., 2023). The first record of the *Thunnus obesus* was in the western Mediterranean Sea (Alboran Sea, Spain), where three juvenile individuals (below 60 cm) were subjected to a genetic study to confirm their taxonomic classification (Bielsa et al., 2021). The first documented record of *Thunnus obesus* was on the coast of Baniyas city on the Syrian coast (eastern Mediterranean Sea) (Hamwi, 2024).

The specimen had a total length of 182 cm, a fork length of 165 cm, and weighed 85 kg at a depth of 20 m. The surface water temperature was 23.4°C. This represents the first record of this species at such a large size in the Mediterranean Sea. The

reasons behind the occasional appearance of the Bigeye tuna in the Mediterranean Sea remain unclear. However, some individuals may stray from their natural range in the open Atlantic Ocean due to changes in ocean currents or temperature patterns (Hyder et al., 2009; Booth et al., 2017; Lam et al., 2016; Dell'apa et al., 2018; Vaihola and Stuart, 2023). Overall, the Bigeye tuna represents a relatively minor component of the tuna populations in the Mediterranean Sea, in comparison to the more abundant and more established species found in the region (Hyder et al., 2009). This report will examine the recent appearance of the Bigeye tuna in the Mediterranean Sea, with a particular focus on the Syrian coast, and relate it to global trends in the distribution of this species.

2. METHODS AND MATERIALS

During a traditional longline fishery at a depth of 25 m from the coastal area of Ras al-Basit, north of Latakia, seven specimens of *Thunnus obesus* were captured on 25 May, 2024, at a sea surface temperature of 22.9°C (Figure 1). The specimens measured in centimeters for length and kilograms for weight, and various morphometric measurements recorded as percentages of total length (TL). The *Thunnus obesus*` identification key was based on the work of (Collette and Nauen, 1983).

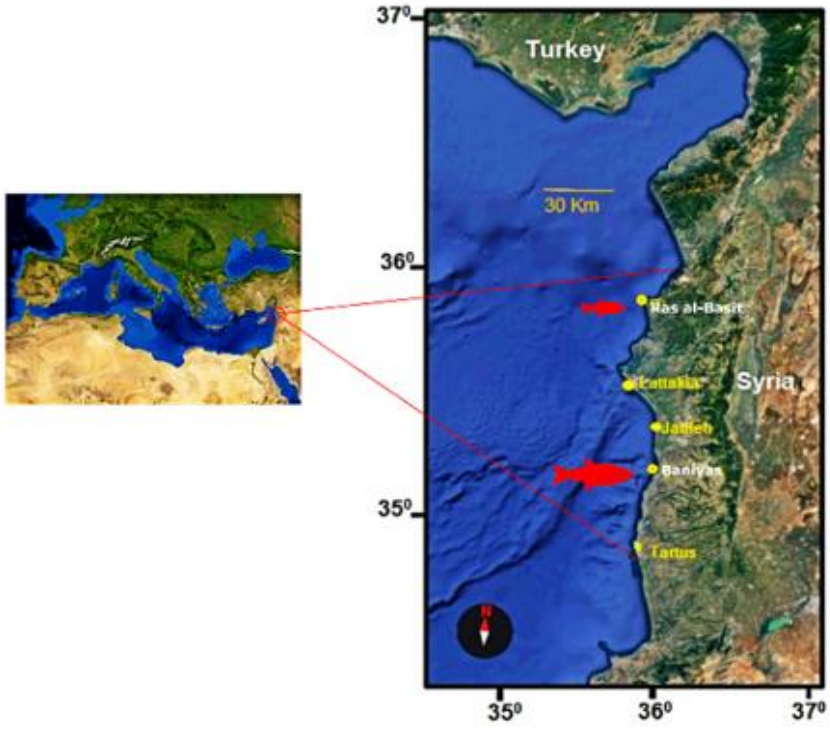

Figure 1 A map of the Syrian coast illustrates the location of *Thunnus obesus* fishing on the Ras al-Basit coast.

3. RESULTS

The specimen of Bigeye tuna, *Thunnus obesus*, is characterized by the following features (Figure 2): The dorsal fin is composed of fourteen spines and fourteen soft rays, while the anal fin has no spines and 14 soft rays. The body is robust and fusiform, with a slight lateral compression. The two dorsal fins are separated by a narrow gap, with the second dorsal fin followed by nine finlets. Additionally, seven finlets follow the anal fin. The pectoral fins are very long and extend past the posterior margin of the dorsal fin in smaller fish, accounting for 31% and 34% of total length and fork length, respectively (Table 1).

Two flaps (interpelvic process) are present between the pelvic fins. Tiny scales cover the body, with a distinct corselet of large and thick scales. The caudal peduncle is very slender, with a robust lateral keel between two smaller keels. The coloration is metallic dark blue on the back, with whitish underparts and belly. An iridescent lateral blue band runs along the sides of live specimens. The first dorsal fin has a deep yellow color, while the anal and second dorsal fins are pale yellow. The finlets are bright yellow with black

borders. The total lengths of the specimens ranged from 75 to 90 centimeters, the fork lengths were between 70 and 82 centimeters, and the weights ranged from 8.5 to 10.5 kilograms.

Figure 2 Specimens of *Thunnus obesus*, with a total length of 75 – 90 cm, were captured from the coast of Ras al-Basit.

4. DISCUSSION

This manuscript presents the second documented occurrence of the Bigeye tuna, *Thunnus obesus*, from the Syrian coast of the eastern Mediterranean Sea. It gives a detailed description of the specimens`main morphometric and meristic characteristics. This discovery represents an extension of the known range of *Thunnus obesus* in the Syrian coastal waters of the eastern Mediterranean Sea. In particular, this is the first record of a *Thunnus obesus* of such a small size found in the Syrian coastal region. Several factors contribute to the expansion of the *Thunnus obesus* distribution in the Mediterranean Sea.

The rise in sea temperatures resulting from climate change may have rendered the Mediterranean Sea more hospitable to this species of tropical tuna, thereby facilitating its expansion into new habitats (Hyder et al., 2009; Booth et al., 2017; Dell'apa et al., 2018; Vaihola and Stuart, 2023). Furthermore, shifts in the distribution and abundance of the small fish that constitute the primary prey of the Bigeye tuna may have prompted them to enter the Mediterranean in search of food (Potier et al., 2004; Ménard et al., 2007). The Bigeye

tuna is also distinguished by its adaptability and opportunistic behavior, enabling it to exploit these novel environmental niches (Lam et al., 2016).

In conclusion, this report contributes to our understanding of the sporadic presence and distribution of the Bigeye tuna in the Mediterranean Sea, particularly along the Syrian coast. Further research will be required to identify the precise mechanisms driving this expansion. However, the factors outlined above are likely to play a significant role. Monitoring these changes in species distribution is paramount for comprehending and managing the marine ecosystem in the context of global change.

Table 1 Morphometric characteristics and Meristic of the Thunnus obesus specimens captured from the Ras al-Basit (Syrian coast).

Morphometric measurements	**Mean (cm)**	**% TL**
Total length (TL)	88	
Standard length (SL)	74	84.1
Fork length (FL)	80	90.9
Head length	19.6	22.3
Body depth	22.5	25.6
Pre-dorsal fin length	23	26.1
Pre-pectoral fin length	20	22.7
Pre-pelvic fin length	23.8	27
Pre-anal fin length	44.9	51
Pectoral fin length	27.3	31
Head length (% HL)		
Eye diameter	3.2	16.3
Pre-orbital length	5.6	28.6
Meristic		
Dorsal fin	XIV+14+9 finlets	
Pectoral fin	30	
Anal fin	14+8 finlets	
Total Weight (TW, kg)	10	

5. CONCLUSION

The sighting of *Thunnus obesus* (Bigeye tuna) along the Syrian coast suggests that the marine biodiversity of the Mediterranean Sea has changed. This observation of the presence of this pelagic fish species, typically found in warmer tropical and subtropical waters, indicates a potential expansion of its distribution range into the Mediterranean. Closely monitoring and thoroughly documenting these ecological developments is imperative to sustain a comprehensive understanding of the regional marine ecosystem. These observations highlight the necessity for further research and study to comprehend the mechanisms and implications of these emerging phenomena within the Mediterranean.

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Author contributions

HN examined specimens and drafted the manuscript. The author gave the final approval for publication.

Informed consent

Not applicable.

Conflicts of interests:
The authors declare that there are no conflicts of interests.

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Ethical approval & declaration
In this article, as per the animal regulations followed in Department of Animal Production, Tishreen University, Lattakia, Syria, the authors documented *Thunnus obesus* on the Syrian coast (eastern Mediterranean Sea). The Animal ethical guidelines are followed in the study for species observation, identification & experimentation.

Data and materials availability
All data associated with this study are present in the paper.

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