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Additional Records of the Wahoo *Acanthocybium solandri* (Cuvier, 1832) from the Central Mediterranean Sea: A Contribution by Citizen Science

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Research Article

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Abstract

The wahoo *Acanthocybium solandri* (Cuvier, 1832) is a large epipelagic scombrid with a circumtropical and subtropical distribution, but its occurrence in the Mediterranean Sea has long been considered rare and mostly based on scattered records. This study reports two photographic records from Tunisian waters, representing the first documented evidence of the species from this sector of the central Mediterranean. The first individual was caught off Teboulba in November 2025 with a seine net, and the second was captured off Ben Guerdane in May 2026 with a trammel net. Both records were shared by fishermen through the citizen science Facebook group "TunSea". No specimens were retained because both individuals were sold immediately; therefore, the identifications were based on photographs showing diagnostic characters, including an elongate fusiform body, cobalt-blue vertical bars, a long-pointed snout, sharp triangular teeth, absence of gill rakers, and the characteristic course of the lateral line. The records add to the increasing number of recent observations from the central and eastern Mediterranean. However, the available evidence remains insufficient to determine the introduction pathway or to infer an established population. Further records supported by precise locality data, morphometric measurements, tissue samples, and genetic analyses are needed to clarify the status and origin of *A. solandri* in the Mediterranean Sea.

Keywords: *Wahoo, Acanthocybium solandri, first occurrence, Tunisian waters, Central Mediterranean Sea, citizen science.*

Introduction

The wahoo *Acanthocybium solandri* (Cuvier, 1832) is a fast-growing, epipelagic scombrid species occurring in tropical and subtropical waters of the Atlantic, Indian and Pacific oceans, and it is also

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known from the Mediterranean Sea (Collette and Nauen, 1983; Fricke et al., 2026). The species is commercially and recreationally important in several regions and has been studied for its growth, reproductive biology and population structure in the Atlantic and Indo-Pacific (Oxenford et al., 2003; Garber et al., 2005; Zischke et al., 2013; Haro-Bilbao et al., 2021; Kindong et al., 2022; Puerto et al., 2023; Triay-Portella et al., 2023).

In the Mediterranean Sea, *A. solandri* has historically been considered uncommon. The earliest documented record was reported from the Tyrrhenian region in the nineteenth century (Döderlein, 1872), followed by sporadic records from Italian waters and later observations from the central and eastern Mediterranean (Romeo et al., 2005; Costa, 2012; Elbaraasi et al., 2019; Fatfat et al., 2024; Gökoğlu et al., 2024; Deidun et al., 2025; Di Natale et al., 2025; Farrag et al., 2025; Fitori and Golani, 2025). The recent increase in records has raised questions about whether the species is becoming more frequent in the basin, whether this pattern is linked to sea warming, and whether new entrances from the Atlantic or through the Suez Canal may be involved.

For rare or sporadically recorded large pelagic fishes, citizen science can provide useful early evidence, particularly when fishermen share photographs that allow diagnostic characters to be checked. Nevertheless, opportunistic records must be interpreted cautiously because they often lack exact coordinates, standardized measurements, biological samples and information on fishing effort. The present note documents two photographic records of *A. solandri* from Tunisian waters, updates the Mediterranean occurrence map, and discusses their significance in a cautious biogeographical context.

Material and Methods

The study is based on two opportunistic records of wahoo from Tunisian waters. The first individual was caught by fishermen off Teboulba, central Tunisia, in November 2025 using a seine net. The second individual was captured off Ben Guerdane, south-eastern Tunisia, in May 2026 using a trammel net. In both cases, photographs were shared by fishermen through the citizen science Facebook group TunSea. The two individuals were estimated at approximately 140 cm TL, based on fishermen's information and the available visual scale in the photographs. The available evidence consists of photographs for the Teboulba specimen and photographs and video frames for the Ben Guerdane specimen; no voucher specimens, tissue samples, weights, fishing depths, or precise coordinates were available because the fish were sold immediately.

Species identification was based on visible external diagnostic characters in the photographs and was compared with descriptions of *A. solandri* and similar scombrid species, particularly *Scomberomorus commerson*, reported from Tunisian waters (Collette and Nauen, 1983; Ben Souissi et al., 2006). Previous Mediterranean records were compiled from the literature and plotted together with the two Tunisian records to provide an updated distributional context (Figure 1).

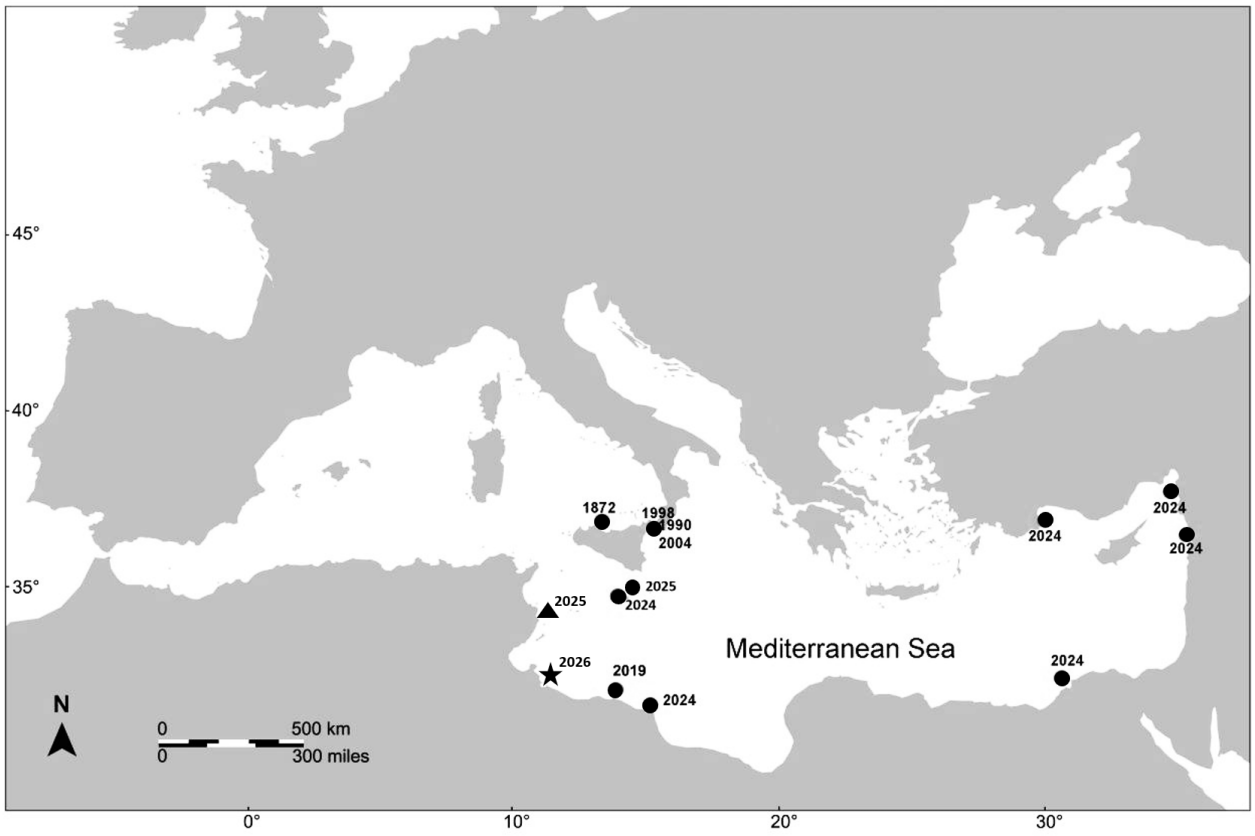

Figure 1. Mediterranean Sea records of *Acanthocybium solandri*, updated after Di Natale et al. (2025) and Fitori and Golani (2025). ●, previous records; ▲, current record off Teboulba; ★, current record off Ben Guerdane. The two Tunisian locations are approximate because precise coordinates were not available.

Results and Discussion

The photographs show two large scombrid fishes with an elongate, fusiform body, dark blue dorsal coloration fading to silvery-white sides and belly, and cobalt-blue vertical bars along the flanks. Both individuals also show a long-pointed snout, a large mouth with sharp triangular serrated teeth, short pectoral fins inserted close to the head, a slender caudal peduncle with a lateral keel, and a lateral line curving downward below the first dorsal-fin region (Figure 2). The close view of the gill arch available for the Ben Guerdane specimen shows the absence of gill rakers. Taken together, the elongate fusiform body and narrow caudal peduncle, cobalt-blue vertical bars, long pointed snout, large mouth with sharp triangular teeth, lack of gill rakers, and lateral-line course are consistent with *Acanthocybium solandri*. Among these characters, the absence of gill rakers and the position of the lateral-line curve are especially useful for separating *A. solandri* from similar scombrids.

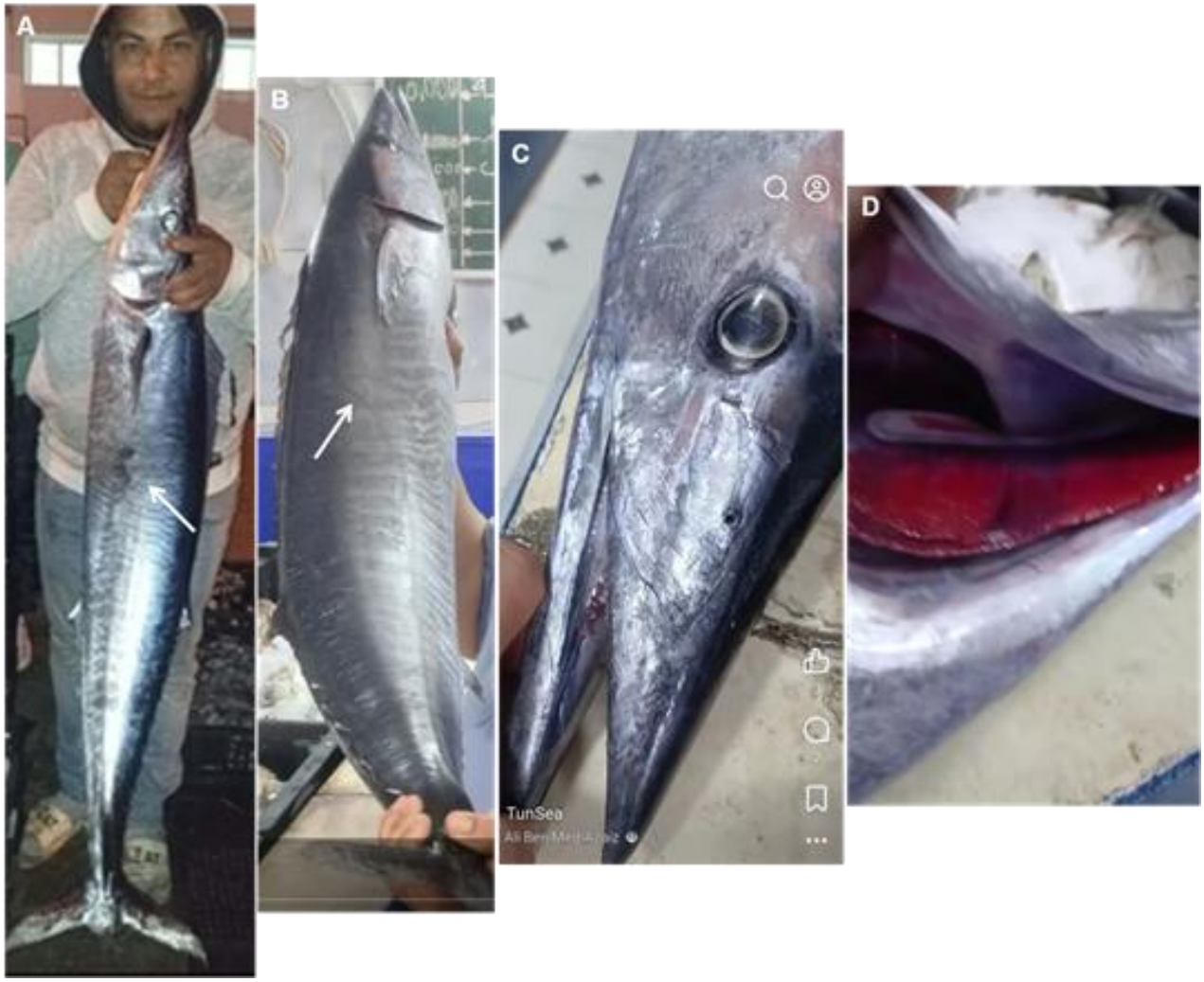

Figure 2. *Acanthocybium solandri* from Tunisian waters. A, specimen from off Teboulba (November 2025); B, specimen from off Ben Guerdane (May 2026); C, head and snout of the Ben Guerdane specimen; D, gill arch showing absence of gill rakers.

The most relevant similar scombrid species in Tunisian waters is *Scomberomorus commerson* (Lacepède, 1800), which has previously been reported from northern Tunisia (Ben Souissi et al., 2006). The Tunisian specimens differ from *S. commerson* by the absence of gill rakers and by the course of the lateral line. In *S. commerson*, gill rakers are present and the lateral line shows a marked downward curve below the posterior part of the second dorsal-fin region, whereas in *A. solandri* the gill rakers are absent and the lateral line curves downward below the first dorsal-fin region (Collette and Nauen, 1983). Based on these characters, the two specimens are identified as *A. solandri*.

The present records extend the documented occurrence of *A. solandri* to Tunisian waters and fill an important gap between previous central Mediterranean records and recent records from the eastern and southern Mediterranean. The chronological distribution of records suggests that the species is being detected more frequently in recent years. However, this pattern should not be interpreted as direct evidence of population establishment. The current records are opportunistic, based on adult-sized individuals, and do not include juveniles, reproductive data, repeated

standardized catches, larval records, or genetic evidence. Therefore, the records indicate occurrence in Tunisian waters but do not demonstrate a self-sustaining population.

The introduction pathway of *A. solandri* into the Mediterranean also remains unresolved. Earlier Italian records are compatible with occasional entry or vagrancy from the Atlantic side, whereas recent records from the eastern Mediterranean and the confirmed occurrence of the species in the Red Sea leave open the possibility of a Lessepsian-related contribution (Williams et al., 2022; Fatfat et al., 2024; Deidun et al., 2025; Fitori and Golani, 2025). At present, the available occurrence data alone cannot discriminate between these scenarios. This point is particularly important because population genetic studies have detected differentiation between Atlantic and Indo-Pacific wahoo, indicating that comparative genetic data from Mediterranean specimens would be useful for testing source regions and pathways (Garber et al., 2005; Haro-Bilbao et al., 2021).

The recent concentration of records in warmer central and eastern Mediterranean areas is consistent with the hypothesis that sea warming may facilitate the occurrence of this thermophilic pelagic species. The 2025 sea-surface temperature and anomaly maps show generally warm conditions and positive anomalies across large parts of the basin (Figure 3). Nevertheless, the present dataset does not allow a statistical test of this relationship. Increased observer attention, social-media reporting, fishing effort, and the growing use of citizen science platforms may also contribute to the apparent increase in records. Consequently, sea warming should be discussed as a plausible contributing factor rather than as a confirmed driver.

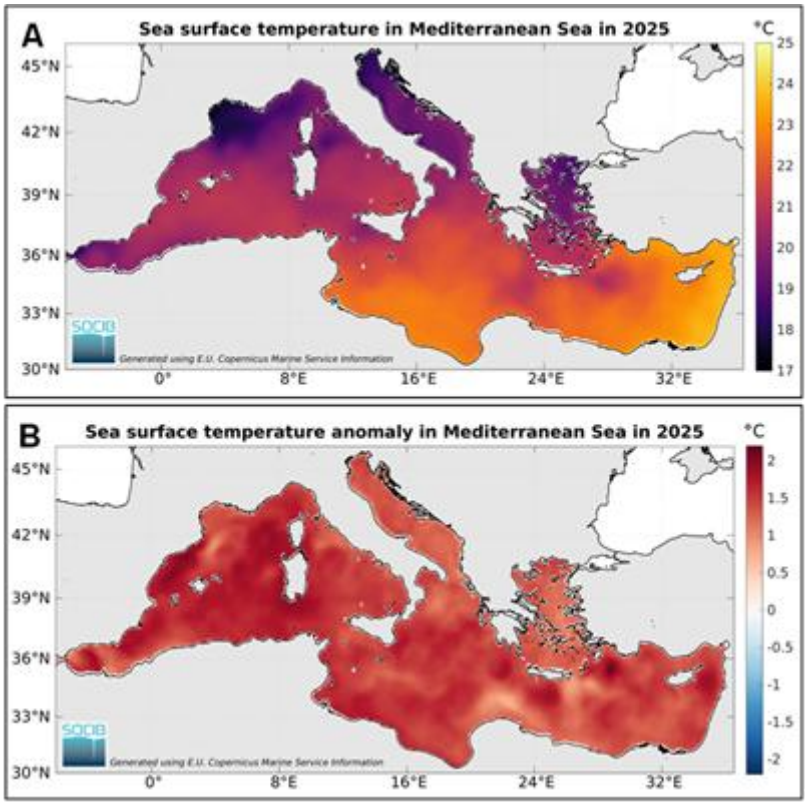

Figure 3. Average sea-surface temperature (A) and sea-surface temperature anomaly (B) in the Mediterranean Sea in 2025 (Juza and Tintoré, 2020).

Despite these limitations, the present records show the value of citizen science for documenting uncommon large pelagic fishes. Photographs and videos shared by fishermen can provide rapid information on species occurrence, especially when specimens are sold or discarded before they can be examined by scientists. To improve the scientific value of future records, contributors should be encouraged to provide precise coordinates, date, gear type, depth, total length, weight, multiple photographs of diagnostic characters, and, whenever possible, a small tissue sample for genetic analysis.

Conclusion

This study provides the first photographic records of Acanthocybium solandri from Tunisian waters and adds two new observations to the growing list of Mediterranean occurrences of this species. The records confirm the presence of the wahoo in the Tunisian sector of the central Mediterranean but do not, by themselves, demonstrate population establishment or resolve the introduction pathway. The findings support the need for continued monitoring, improved citizen-science reporting protocols, and genetic analyses of future Mediterranean specimens to clarify whether recent records reflect occasional vagrancy, repeated introductions, or an emerging resident component in the basin.

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Conflict of Interest

The author declares that for this article there are no conflicts of interest.

Ethical Approval Statement

No experimental sampling was conducted for this study. The records are based on photographs and videos shared after commercial or artisanal capture; therefore, ethics committee approval was not required.

Data Availability Statement

The data used in the present study are available upon request from the corresponding author.

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