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NO LONGER AS COMMON AS ITS NAME: A REVIEW OF THE OCCURRENCE OF *TORPEDO TORPEDO* (LINNAEUS, 1758) (CHONDRICHTHYES: ELASMOBRANCHII) IN TURKISH WATERS, WITH PHOTOGRAPHIC EVIDENCE

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ABSTRACT

*On 26 August 2010, a common torpedo (*Torpedo torpedo*), was incidentally captured in bottom-trawl fishery off the coast of Samandag (northeastern Mediterranean Sea). The specimen was a male measuring 295 mm in TL, 152 mm in DW, and weighing 327 g. A systematic review of available data revealed that there have been at least 12 specimens of* T. torpedo *captured in Turkish waters. However, contemporary catch records from the investigated area show that the common torpedo is no longer as common in Turkish seas as its name might suggest – a fact further corroborated by the sporadic nature of these records. To develop and implement an effective management plan for the conservation of* T. torpedo*, systematic data collection is essential.*

Key words: Common torpedo, Turkish seas, status, occurrence

NON PIÙ COSÌ COMUNE COME IL SUO NOME: REVISIONE DELLA PRESENZA DI *TORPEDO TORPEDO* (LINNAEUS, 1758) (CHONDRICHTHYES: ELASMOBRANCHII) IN ACQUE TURCHE, CON PROVE FOTOGRAFICHE

SINTESI

*Il 26 agosto 2010, una torpedine comune (*Torpedo torpedo*), è stata catturata accidentalmente durante la pesca a strascico al largo delle coste di Samandag (Mediterraneo nord-orientale). L'esemplare era un maschio di 295 mm di lunghezza totale, 152 mm di larghezza del disco e pesava 327 g. Una revisione sistematica dei dati disponibili ha rivelato che ci sono stati almeno 12 esemplari di* T. torpedo *catturati nelle acque turche. Tuttavia, le registrazioni contemporanee delle catture nell'area indagata mostrano che la specie non è più così comune nei mari turchi come il suo nome potrebbe suggerire - un fatto ulteriormente corroborato dalla natura sporadica di queste registrazioni. Per sviluppare e implementare un piano di gestione efficace per la conservazione di* T. torpedo*, è essenziale una raccolta sistematica di dati.*

Parole chiave: torpedine comune, mari turchi, status, presenza

INTRODUCTION

Electric rays, also known as torpedo rays, belong to the family Torpedinidae (Elasmobranchii: Torpedinidae) (Froese & Pauly, 2024). In the Mediterranean Sea, this family is represented by two genera – *Tetronarce* and *Torpedo* – and four species: *Tetronarce nobiliana* (Bonaparte, 1835), *Torpedo marmorata* Risso, 1810, *T. sinuspersici* Olfers, 1831, and *T. torpedo* (Linnaeus, 1758) (Serena *et al*., 2020; Barone *et al*., 2022). Despite the established presence of *T. nobiliana*, *T. marmorata*, and *T. torpedo* throughout the Mediterranean Sea – although with varying frequencies across its subregions (Follesa *et al*., 2019) – the Lessepsian immigrant *T. sinuspersici* is considered a species whose occurrence in the region still needs to be confirmed (Barone *et al*., 2022). Among the four Mediterranean torpedinids, the common torpedo, *T. torpedo*, is the most distinctive taxon characterized by its ocellated dorsal pattern, which allows for quick and reliable species identification (Serena *et al*., 2020; Barone *et al*., 2022). Besides the Mediterranean Sea, *T. torpedo* is also found in the eastern Atlantic, where its distribution range extends from Angola to the southern Bay of Biscay (Ebert & Stehmann, 2013).

The presence of *T. torpedo* in Turkish seas has been documented since one of the earliest ichthyological inventories of the region, where it was referred to as *T. ocellata* Rafinesque, 1810 (Ninni, 1923). However, subsequent studies from the Turkish Aegean and Mediterranean waters have reported extremely low numbers of examined specimens (≤ 4 specimens per study) (e.g., Geldiay, 1969; Kabasakal, 2002; Eryılmaz, 2003; Torcu Koç *et al*., 2012; Yemişken *et al*., 2014; Yağlıoğlu *et al*., 2015). As a result, the common torpedo is now considered an uncommon species in the region, a pattern also noted for the broader Mediterranean Sea (Tsikliras & Dimarchopoulou, 2021). According to Tsikliras and Dimarchopoulou (2021), *T. torpedo* is among the Mediterranean rays with significant knowledge gaps that require further study. This article analyses photographs of an individual reported by Yemisken *et al*. (2014) and provides a review of the species' occurrence in Turkish waters.

Fig. 1: Maps showing approximate capture locations for** T. torpedo **in Turkish seas.
Sl. 1: Zemljevid obravnavanega območja s približnimi lokalitetami ulova vrste** T. torpedo **v turških morjih.

MATERIAL AND METHODS

Geographical subarea (GSA) designations follow the framework of the General Fisheries Council for the Mediterranean (GFCM, 2018). The present specimen of *T. torpedo* was incidentally captured off the coast of Samandag, in the northeastern Mediterranean Sea (GSA 24; Fig. 1). The sampling survey was conducted aboard a 21 m commercial stern-trawler *FV Azaklar*, towing a bottom trawl with a 44 mm knot-to-knot cod-end mesh opening. Due to the influence of upwelling currents and terrestrial nutrient inputs, Iskenderun Bay, where the coast of Samandag is located, exhibits high primary productivity and is therefore considered one of the most important bottom-trawling zones in the entire Mediterranean Sea (Yemişken *et al*., 2014). The examined common torpedo individual, which was originally documented by Yemisken *et al*. (2014), was collected in commercial bottom-trawling fishery. The haul, conducted over a mixed bottom of mud and sand at an average depth of 51 m, started at 36.065550º N, 35.540060º E and ended at 36.020070º N, 35.570200º E. Species identification was performed following Barone *et al*. (2022), with taxonomic nomenclature according to Froese and Pauly (2024). Unfortunately, the captured individual could not be preserved after biometric measurements. Total length (TL) and disc width (DW) were measured to the nearest millimeter using a measurement tape, while mass (W) was recorded to the nearest gram. These data will be made available upon request.

Data on the occurrence of *T. torpedo* in Turkish waters were compiled from two main sources: (1) published scientific literature (including both general ichthyological studies and elasmobranch-specific articles) reporting records of this species, and (2) grey literature including unpublished data from ichthyological surveys conducted by the former Hydrobiological Research Institute of Istanbul University and the former Fishery Research Center under the Meat and Fish Office of the Republic of Türkiye. Each record was assessed for data quality based on the scoring criteria proposed by Kovačić *et al*. (2020).

RESULTS AND DISCUSSION

On 26 August 2010, a male common torpedo was captured (Fig. 2), measuring 295 mm in total length (TL), 152 mm in disc width (DW), and weighing 327 g (W). The following description outlined the outer morphology and coloration of the examined specimen: body disc fairly circular with a broadly truncated front margin; tail stout and massive, bearing two distinct dorsal fins, with the first being larger than the second; spiracles rimmed by knob-like papillae of varying lengths; dorsal surface

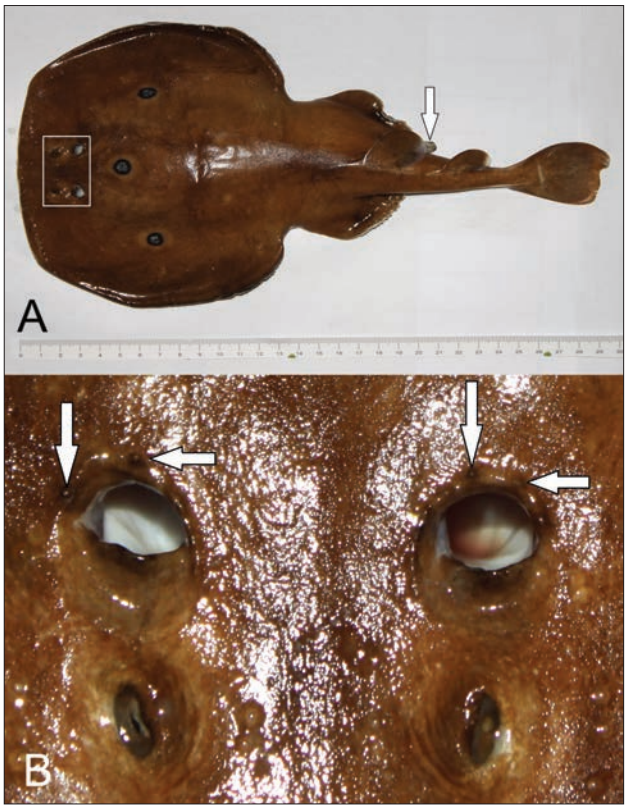

Fig. 2: (A) Dorsal view of the examined** T. torpedo **specimen, with the white rectangle outlining the spiracle region (shown in detail below) and (↓) indicating the clasper tip; (B) close-up of spiracles, with the arrows indicating knob-like papillae along the spiracular margins.
Sl. 2: (A) Dorzalni pogled na pregledani primerek** T. torpedo**, z belim pravokotnikom, ki označuje strčnice (spirakla) (podrobno prikazano spodaj) in (↓), ki označuje konico klasperja; (B) bližnji posnetek spirakla s puščicami, ki označujejo gumbaste papile vzdolž spiralnih robov.

light reddish-brown, featuring three blue-centered eye-spots encircled by black and yellowish outer rings, ventral surface creamy white; claspers hard and calcified, with tips reaching well beyond pelvic fins tips; eyes smaller than spiracles. A dorsal view and close-up of the spiracles of the examined common torpedo are shown in Figure 2.

The basic literature on elasmobranch taxonomy describes *T. torpedo* as a torpedinid species characterized by a dorsal surface patterned with 1 to 7 blue-centered eye-spots (or ocelli), each encircled by black and orangeish-yellow rings (Ebert & Stehmann, 2013; Barone *et al*., 2022). The spiracles, which are larger than the eyes, are rimmed with small knob-like papillae (Ebert & Stehmann, 2013; Barone *et al*., 2022). These descriptive characters are the main dichotomous

Tab. 1: Historical and contemporary records of** Torpedo torpedo **from Turkish waters. *Confirmed presence criteria (adapted from Kovačić et al., 2020; pp. 2–3, Table 1) are defined as follows: (1) Collection: verified presence, (2) Publication: evidence from photograph, (3) Publication: evidence based on morphological or genetic data, (4) Publication: expert providing individual collection data, (5) Publication: expert conducting a broad study, and (12) Unpublished: record supported by a photograph and/or morphological data, but still unpublished or only mentioned in grey literature. SoM: Sea of Marmara (GSA 28); AS: Aegean Sea (GSA 22); NLS: Northern Levant Sea (GSA 24). N/A: Data not available.

Tab. 1: Zgodovinski in recentni zapisi o pojavljanju vrste** Torpedo torpedo **iz turških voda. *Kriteriji potrjene prisotnosti (prirejeno po Kovačić in sod., 2020; str. 2–3, tabela 1) so opredeljeni takole: (1) Zbirka: preverjena prisotnost, (2) Objava: dokaz s fotografije, (3) Objava: dokaz, ki temelji na morfoloških ali genetskih podatkih, (4) Objava: strokovnjak, ki zagotavlja podatke o posamezni zbirki, (5) Objava: strokovnjak, ki izvaja obsežno študijo, in (12) Neobjavljeno: zapis o pojavljanju podprt s fotografijo in/ali morfološkimi podatki, vendar še neobjavljena ali pa je omenjena le v sivi literaturi. SoM: Marmarsko morje (GSA 28); AS: Egejsko morje (GSA 22); NLS: Severno Levantsko morje (GSA 24). N/A: podatki niso na voljo.

No	Date	Locality	Depth (m)	Criteria*	References and remarks
1	Before 1923	SoM	N/A	4	Ninni (1923); although in the majority of the general ichthyological (Bilecenoğlu *et al*., 2002, 2014; Bilecenoğlu, 2024) or elasmobrabchii spesific (Artüz & Fricke, 2024) checklists referred to Ninni (1923) as the first record reference of *T. torpedo* in the SoM, author was not specified the exact locality where the examined specimen(s) captured; however, Ninni (1923) positively identified the species and gave the description of ocellated pattern (5 in the reference) of dorsal surface, and considered the species as 'common'.
2	Before 1926	SoM	N/A	4	Deveciyan (1926); although the author only reported the presence of *T. marmorata* in the region based on the findings of his visits to Istanbul Fish Market, he also provided the description of the ocellated pattern (5 in the reference) of dorsal surface of an electric ray that he encountered in the same fish market but did not specify it as *T. torpedo*.
3	23 Sept. 1960	SoM	N/A	12	Unpublished data. A male specimen (TL 290 mm and W 300 g) has been captured in scientific bottom-trawl survey conducted by former Fishery Research Center, Meat and Fish Office of Republic of Türkiye. No photo of the examined specimen is available but the species was recorded as *T. torpedo* in the species list of the survey.
4	Before 1968	AS	N/A	4	Geldiay (1969); captured in waters of Bay of Izmir in bottom long-line fishery.
5	1974	SoM	N/A	12	Unpublished data. Several specimens have been either captured or sighted in the 'Biological Information for Sewage Disposal in the Bosphorus' project conducted by former Hydrobiological Research Institute of Istanbul University. Observed specimens specified as *T. narke* Risso, 1810 in the ichthyological inventory of the survey, and while it has been considered as 'rare' in the Black Sea opening of the Bosphorus Strait, it has been considered as 'frequently found' in the SoM.
6-9	1995-1999	SoM, AS, NLS	N/A	4	Kabasakal (2002). Examined number of specimens (n=2) is mistyped in the reference and the actual number is 4 (one specimen per station specified in table 1 of the reference).
10	Sept. 2000	AS	60	4	Eryılmaz (2003). One specimen (520 mm TL) was captured in bottom-trawl fishery and coordinates of locality of capture are as follows: 39°44′32″ N, 25°53′48″ E. The order of the coordinates is given incorrectly in the reference.
11	2009-2010	NLS	≤50	4	Yağlıoğlu *et al*. (2015). *T. torpedo* consisted 0.12% of the total biomass of the elasmobranch in Iskenderun Bay bottom-trawl fishery
12	2010-2011	NLS	51	4	Yemişken *et al*. (2014). One specimen has been captured in Iskenderun Bay. *T. torpedo* formed 0.07% of the total biomass of discarded bycatch in bottom-trawl fishery conducted in the region.

keys used to identify northeastern Atlantic (Ebert & Stehmann, 2013) and Mediterranean torpedinid species (Barone *et al*., 2022). Since the external morphology of the examined specimen – as outlined above – matched the descriptions provided by Ebert and Stehmann (2013) and Barone *et al*. (2022), the individual was positively identified as *Torpedo torpedo* (Linnaeus, 1758).

According to Bilecenoğlu (2024), *T. torpedo* occurs in the Sea of Marmara (SoM) and in Turkish Aegean and Mediterranean waters. Although the species is considered very rare in Turkish waters, its occurrence has been confirmed in contemporary studies (e.g., Kabasakal, 2002; Eryılmaz, 2003; Torcu Koç *et al*., 2012; Yemişken *et al*., 2014; Yağlıoğlu *et al*., 2015). A critical retrospective review of ichthyological checklists of Turkish seas, published roughly a decade apart (Bilecenoğlu *et al*., 2002, 2014; Bilecenoğlu, 2024), reveals that all these studies cite the occurrence of *T. torpedo* in the SoM based on a century-old reference: Ninni (1923). Beyond the checklists compiled by Bilecenoğlu (and colleagues), the species' occurrence in the SoM is also mentioned in a much earlier ichthyological catalogue of Turkish seas by Mater & Meriç (1996), which – however – provides no information on the localities and depths of capture for the examined specimen(s) nor does it indicate where voucher specimen(s) are deposited. Notably, Mater and Meriç (1996) do not specify their source for the species' reported presence in the SoM either. A summary of historical and contemporary records of *T. torpedo* in Turkish seas is presented in Table 1.

In the International Mediterranean Trawl Survey (MEDITS), conducted to collect data on the distribution and demographic structure of demersal species inhabiting the continental shelf and upper slope, the frequency of *T. torpedo* occurrence (%) within the 10–200 m depth range varied from 0.8% in Sardinian waters (GSA 11) to 3.7% in the western Ionian Sea (GSA 19) (Follesa *et al*., 2019). According to Damalas and Vassilopoulou (2011), 29 specimens of *T. torpedo* were incidentally captured in bottom-trawl fisheries in the central Aegean Sea (GSA 22) between 2003 and 2006, corresponding to a median catch of 0.13 per unit of effort (CPUE kg/h). Despite recent sporadic records of the common torpedo in the SoM (Kabasakal, 2002; Torcu Koç *et al*., 2012) as well as in Turkish Aegean (Eryılmaz, 2003) and Mediterranean waters (Yemişken *et al*., 2014; Yağlıoğlu *et al*., 2015), the species' consistent absence from recent large-scale demersal surveys (e.g., Filiz *et al*., 2018; Gül & Demirel, 2020; Daban *et al*., 2021; Deval & Mutlu, 2024; Karadurmuş & Sarı, 2024) strongly suggests that *T. torpedo* is not a common batoid in the region and may indeed be extremely rare. According to Bengil and Başusta (2018), *T. torpedo* accounts for merely 0.01% of total elasmobranch bycatch biomass in Turkish waters. In contrast, Tiralongo *et al*. (2019) reported *T. torpedo* to be a common electric ray in Sicilian Ionian waters (GSA 19), an observation consistent with the 5.2% frequency of occurrence recorded for this species in the western Mediterranean (GSA 9) by Follesa *et al*. (2019).

Based on the available data, it is reasonable to conclude that *T. torpedo* is no longer as common in Turkish seas as its name might suggest. The scarcity of contemporary catch records from the study area and their sporadic nature supports the species' declining presence in the region. According to Tiralongo *et al*. (2019), *T. torpedo* is a k-selected batoid species and is currently classified as Vulnerable on the IUCN Red List (Jabado *et al*., 2021). Its biological traits – including low ovarian fecundity (ranging from 3 to 20 eggs; Tiralongo *et al*., 2019), a moderately long generation length (10 years; Jabado *et al*., 2021), and its occurrence in habitats overlapping with demersal fisheries – make it particularly vulnerable to the impacts of untargeted capture. To develop and implement an effective management plan for the conservation of *T. torpedo*, systematic data collection is essential, as emphasized by both GFCM (2018) and Tsikliras & Dimarchopoulou (2021).

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NI VEČ TAKO POGOST KOT NJEGOVO IME: PREGLED POJAVLJANJA OKATEGA ELEKTRIČNEGA SKATA *TORPEDO TORPEDO* (LINNAEUS, 1758) (CHONDRICHTHYES: ELASMOBRANCHII) V TURŠKIH VODAH S FOTOGRAFSKIMI DOKAZI

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POVZETEK

*26. avgusta 2010 so pri ribolovu s pridneno vlečno mrežo ob obali Samandaga (severovzhodno Sredozemsko morje) slučajno ujeli okatega električnega skata (*Torpedo torpedo*). Bil je samec, ki je v telesno dolžino meril 295 mm, v premeru diska 152 mm in tehtal 327 g. Na podlagi sistematičnega pregleda razpoložljivih podatkov se je izkazalo, da je bilo v turških vodah doslej ujetih vsaj 12 primerkov okatega električnega skata. Sodobni zapisi z raziskovanega območja kažejo, da okati električni skat ni več pogosta vrsta v turških vodah kot bi sklepali iz angleškega imena (Common electric ray) – dejstvo, ki ga dodatno potrjuje občasna narava teh zapisov. Za razvoj in izvajanje učinkovitega načrta upravljanja za ohranitev vrste* T. torpedo *je bistveno sistematično zbiranje podatkov.*

Ključne besede: okati električni skat, turška morja, status, pojavljanje

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