

# First record of *Terapon theraps* (Terapontidae) in the Aegean Sea (Greece)

by

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**RÉSUMÉ.** - Première capture de *Terapon theraps* (Terapontidae) en mer Égée (Grèce).

L'espèce indo-pacifique *Terapon theraps* Cuvier, 1829 (Terapontidae) est signalée pour la première fois dans le golfe de Thermaïque en mer Égée (Grèce). Cette référence est fondée sur un spécimen capturé vivant près des côtes, à proximité du canal de Nea Potidaia dans la péninsule de Halkidiki (Macédoine). Cette capture est la seconde pour toute la Méditerranée et la première pour la mer Égée. On discute aussi de l'origine et du processus de dispersion de cette espèce, qui semble avoir été plutôt transportée dans l'eau des ballasts de navires.

**Key words.** - Terapontidae - *Terapon theraps* - Aegean Sea - Indo-Pacific distribution - First record.

Terapontidae is a perciform family including 16 genera and about 48 fish species (Nelson, 2006), which are frequent in the marine coastal, brackish and freshwater of the Indian and West Pacific oceans, including the Red Sea. The species, *Terapon jarbua* Forsskål, 1775 was recently reported in the Mediterranean coast of Israel (Golani and Appelbaum-Golani, 2010) increasing the Lessepsian terapontid species to four, namely: *Pelates quadrilineatus* Bloch, 1790, *Terapon puta* Cuvier, 1829, *T. jarbua* and *T. theraps*, Cuvier, 1829. The last one, was firstly reported in the Adriatic Sea (Lipej *et al.*, 2008), distant enough from all the above distribution. Although Terapontidae family includes coastal fishes, it still remains very rare in the eastern Mediterranean.

The first record of an alive specimen of the species *T. theraps* from Chalkidiki peninsula marine area, Northern Aegean Sea, Greece, some biological characteristics and a genetic analysis are given in the present work.

## MATERIALS AND METHODS

On 10 September 2008 a specimen of *T. theraps* (Fig. 1) with a total length of 153 mm and a weight of 68 g was captured alive by gillnets in 20 m depth in Thermaikos Gulf, Northern Aegean Sea, Greece, (Fig. 2). The water temperature was 20 °C, the salinity 36.5‰ and the seabed was covered with sea grass. The specimen of *T. theraps* was deposited in the Ichthyological collection of the Alexander Technological Educational Institute of Thessaloniki, Department of Fisheries and Aquaculture Technology (catalogue number 2008-010).

Total DNA was extracted from muscle and the mitochondrial COI gene was amplified according to Ward *et al.* (2005). The size of the PCR product was checked against a 100 bp DNA ladder and was approximately 700 base pairs. A sequencing analysis on a 3730 × 1 DNA Analyzer (Applied Biosystems, Inc.; www.appliedbiosystems.com) followed, using both forward and reverse primers for cross-checking.



Figure 1. - *Terapon theraps*, 153 mm total length; Northern Aegean Sea, Eastern Mediterranean.

## RESULTS

### Description

On the base of one specimen; body oval, compressed, and robust; lower opercular spine extending clearly beyond the opercular flap; post-temporal bone exposed posterior and serrate; color dusky dorsally, silvery-white ventrally; body, head and fins with an iridescent sheen; four longitudinal brown stripes extend on the upper side from the head; similar brown stripes run across the caudal fin; a large prominent black blotch between 3<sup>rd</sup> and 7<sup>th</sup> spines in the spinous portion of the dorsal fin; soft part of dorsal fin with a dark band along upper portions of anterior rays and a horizontal band on posterior rays, anatomically, an amount of fat concentrations between internal organs was observed, approximately 3 g.

### Meristics

Dorsal (D) = XII + 10; anal (A) = II + 8; ventral (V) = I + 5; pectoral (P) = 13; lateral line scales (L.L.) = 55; scale rows above lateral line, 8.

### Genetic analysis

A total of 670 base pairs of the COI gene fragment were successfully sequenced. The DNA sequence was deposited in GenBank (accession number: JF340158).

## DISCUSSION

The species *T. theraps* and *T. puta* are morphologically similar, and they differ on the number of lateral line scales (46-56 in *T. theraps* and 70-85 in *T. puta*) and on the number of rows of scales above lateral line (6-8 in *T. theraps* and 10-13 in *T. puta*) (Fischer & Whitehead, 1974; Vari 1984). Also, the maximum length for *T. theraps* is 32 cm (commonly to 22 cm) while for *T. puta* is 15 cm (commonly 11-13 cm) (Vari, 2001). So, the Chalkidiki specimen having 8 rows of scales above lateral line, 55 lateral line scales and being 15.3 cm in

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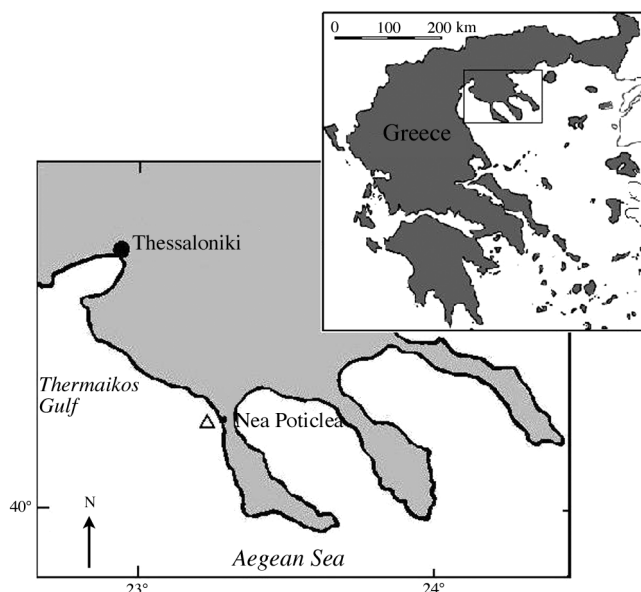


Figure 2. - Map of the Chalkidiki peninsula and Thermaikos Gulf, northern Aegean Sea (Greece) showing the capture site of *Terapon theraps* specimen ( $\Delta$ ) off the waters of Nea Potidea.

length should be classified as *T. theraps*.

The species seems to keep its original habits, i.e., to be frequent in the low depth shallow coastal waters where it is caught by trawlers and long-lines in its original distribution area (Indo-West Pacific).

How does this species reach the Mediterranean, mainly in areas far away from the usual road of lessepsian penetration? Various hypotheses would be arising for this matter. It may represent a vagrant fish or presumably entered the Mediterranean Sea via the Suez Canal but also possibly escaped from some human activity (Lipej *et al.*, 2008). However, some remarkable coincidences must be underlined, such as: both specimens of *T. theraps* recorded in the Mediterranean (Istria and Chalkidiki peninsulas), appear in parallel ecological circumstances. Namely, only one alive individual is reported in each area in about the same period (August-September), in a time gap of almost a year (2007-2008) and in about the same depth ( $\approx 20$  m). Also they were collected near large busy ports (Trieste and Koper in the Adriatic Sea; Thessaloniki and Nea Moudania in the Aegean Sea). The same phenomenon was reported for *T. jarbua* as well, collected in the vicinity of the port of Haifa (Golani and Appelbaum-Golani, 2010). In the above cases, dense maritime traffic occurs, and noticeably all specimens were collected close to the area where ships enter the port and more specifically in the southern part of it, when approaching it by the open sea.

All the above suggest that individuals of *T. theraps* have been probably brought to several shores of the Mediterranean with a cargo ship (freighter) in its water ballast, that is considered as one of the major ways for the carrying and spreading of non-native species into aquatic ecosystems, lying faraway. An inquiry on commercial shipping circulations to the port authorities of Thessaloniki and Nea Moudania (Thermaikos Gulf, North Aegean Sea), shows that two to three months before the appearance of *T. theraps* in the area, but also during all the year 2008, many cargo ships (loaded and unloaded) delivered to these ports arriving from ports near the Suez Canal from Red Sea (Suez, Aqaba) and Mediterranean (mainly Damietta, which has the largest container terminal, and Port Said). The previous are reinforced by the report of one individual of *T. jarbua* that was found in the ballast tank of a cargo ship that had been traveling for 14 days

from the origin to the destination port (Williams *et al.*, 1988). Consequently the ballast carrying hypothesis seems to be more appropriate. On the other hand, it is almost impossible for the fish to cross such an extremely long distance, from Suez Canal up to the upper limits of the Adriatic and/or of the Aegean Seas, on its own. Additionally, it has never been reported in the between area, given that all family members are easily distinguishable by fishermen, due to their special colour pattern.

Furthermore, another question is also rising: is this tropical species able to live and to establish viable populations in this upper latitude of 40° N, as in the northern Mediterranean and withstand the water temperatures, that varies in summer from 19.5 to 24°C and in winter from 11.5 to 16°C? Probably not, given that while it has the opportunity to do that in its natural range in the Indo-Pacific Ocean it never reaches high latitudes. As it is known in literature, the species *T. theraps* is common as southward as 30° S, in the coasts of East Africa, Madagascar (Vari, 1984) and to Perth and southward to Queensland (Australia) (Fisher and Whitehead, 1974) to northward as 30° N, in Red Sea, Persian Gulf (Vari, 1984) and Southern Japan (Masuda *et al.*, 1984).

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