

Marine Record

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New record of smalltooth sand tiger *Odontaspis ferox* (Risso, 1810) in the Mediterranean

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Abstract

One shark was landed at the Naval Base Pasha Liman, Bay of Vlore, Albania, the Adriatic Sea. Photographic records only enabled the specimen to be placed in family Odontaspidae or Carchariidae. Later examination of the preserved head, dry jaw and dentition identified the specimen as *Odontaspis ferox*. This is a rare record and the northernmost Mediterranean observation of this species, and the first Adriatic record for several decades.

Introduction

Within the list of 88 chondrichthyan species (sharks, batoids and chimaeras) that are recorded in the Mediterranean 48% of species are regularly recorded, while 14% of species are becoming increasingly rare. The list includes 48 species of sharks belonging to 18 families, including Odontaspidae (Serena *et al.*, 2020).

Until recently it was considered that family Odontaspidae was represented in the Mediterranean by two genera and two species: sand tiger shark *Carcharias taurus* Rafinesque, 1810 and smalltooth sand tiger *Odontaspis ferox* (Risso, 1810). However, the latest taxonomy separates *C. taurus* from the Odontaspidae and assigns it to family Carchariidae, thus leaving *O. ferox* as the only Mediterranean species of Odontaspidae (Fricke *et al.*, 2022). The second member of family Odontaspidae is the bigeye sand tiger, *Odontaspis noronhai* (Maul, 1955), which occurs in the Indian, Pacific, and Atlantic oceans: this is arguably the most rarely captured extant lamniform species (Compagno, 2002).

Smalltooth sand tiger was first described from the Mediterranean Sea by Risso (1810), but is now known to have a cosmopolitan but disjunct distribution in warm-temperate and tropical waters of all oceans (Bonfil, 1995; Fergusson *et al.*, 2008).

Odontaspis ferox is a large, bulky shark that can reach a maximum total length of at least 450 cm. Distinguishing characteristics are a long, bulbously conical snout and moderately large teeth with prominent narrow cusps and two or more pairs of lateral cusplets. The second dorsal fin is smaller than the first dorsal fin but broad-based, while the first dorsal fin is closer to pectoral fins than pelvic fins. The colour is medium grey or grey-brown above, usually lighter below, sometimes with darker spots scattered on the body (Ebert *et al.*, 2021). It is reported on or near the bottom on continental and insular shelves and upper slopes at depths of 13–420 m. Reproduction is poorly known, and litter size unknown. Size at birth is over 105 cm, males mature at 200–250 cm and females at 300–350 cm (Ebert *et al.*, 2021).

Fergusson *et al.* (2008) suggested a declining abundance of *O. ferox*, highlighting the vulnerability of the species to both accidental and directed fishing pressure. The species is listed by IUCN as Vulnerable globally (Graham *et al.*, 2016) and Critically Endangered in the Mediterranean (Dulvy *et al.*, 2016; Pollard *et al.*, 2016).

During the 20th century, although *O. ferox* was recorded widely across the Mediterranean 14 records were observed by Fergusson *et al.* (2008) while the MEDLEM (Mediterranean Large Elasmobranchs Monitoring) database contains only 10 records of *O. ferox* (Mancusi *et al.*, 2020). Hence, only a very few records were made during the past two decades, these mainly from the Eastern Mediterranean (Corsini-Foka, 2009; Damalas & Megalofonou, 2012; Kabasakal & Bayri, 2019; Akbora *et al.*, 2019). In the Adriatic, *O. ferox* and *C. taurus* were seen together at Croatian fishmarkets, albeit marketed under different names, during the last decade of the 20th century (Soldo, 2006). The last record of *C. taurus* from the Adriatic occurred in 1999, and *O. ferox* is now considered to be very rare in the Adriatic Sea (Lipej *et al.*, 2004; Soldo & Lipej, 2022).

This paper presents a rare observation of *O. ferox*: the northernmost Mediterranean record and the first in the Adriatic record for several decades.

Materials and methods

On 22 April 2021 a shark was landed dead at the Naval Base Pasha Liman, Bay of Vlore, Albania, Adriatic Sea (Figure 1). Videos recorded before it was landed show strange behaviours including slow swimming and rubbing against the shore installations. The shark was



Fig. 1. Map of the area indicating (*) where the specimen was landed.

subsequently killed by Naval Base personnel. Length was estimated as about 300 cm by comparing the size of the shark in photos and videos to known fixed shore installations.

Species-level identification was not possible from photographs and videos. Fortunately, the head of the specimen had been preserved by the personnel of the Naval Base and identification was confirmed from the dry jaw and dentition.

Results and discussion

Photographic material shows a large, heavy-bodied female shark with conical to slightly depressed pointed snouts, long mouths



Fig. 2. Landed shark with uniform chocolate brown colouration without dark spots (photo by Sazan Pashollari).

extending behind small eyes, moderately long gill openings in front of pectoral fin origins, two large dorsal fins and an anal fin, small pectoral fins, and an asymmetrical caudal fin with a strong but short ventral lobe. These are characteristics of family Odontaspidae, but also Carchariidae, known to be represented in the Mediterranean by two species: *Odontaspis ferox* and *Carcharias taurus* (Ebert *et al.*, 2021). Key external characteristics that distinguish between these two species, such as the relative positions of the first dorsal fin and pectoral fin, were not visible. Furthermore, the freshly killed specimen had an unusual uniform chocolate brown colouration without dark spots on the sides of the body (Figure 2), which is considered a diagnostic feature of *Odontaspis noronhai* (Ebert *et al.*, 2021). Although *O. noronhai* has not been reported in the Mediterranean, it is so poorly known that its occurrence could not be excluded.



Fig. 3. Detail of the upper jaw.

Examination of the preserved head revealed that both upper and lower jaws have a pair of symphyseal teeth. Most of the teeth have two cusplets on each side (Figure 3). The upper jaw starts with two anterior teeth much larger than sequential teeth, and has four rows of small intermediate teeth between anterior and lateral teeth. Lower jaw anterior teeth are larger than sequential teeth. These jaw and dental characteristics correspond with previous descriptions of *O. ferox* and distinguish it from the other two species (Bonfil, 1995; Compagno, 2002; Tavares et al., 2019; Pollerspöck & Straube, 2020; Ebert et al., 2021).

Although the colouration is unusual for *O. ferox*, it is not unique; similar colouration was observed in a smalltooth sand tiger washed up on the beach at Agon-Coutainville, department of Manche, Normandy, France, in August 2012 (Ouest-France (2012), accessed online 25 March 2022).

This is the first record of *O. ferox* in the Adriatic for several decades. The species remains very rarely reported in the Adriatic and wider Mediterranean.

Data

The data that support the findings of this study are available from the corresponding author, [AS], upon reasonable request.

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Author contributions. All three authors formulated the research question, designed and carried out the study. Alen Soldo analysed the data and interpreted the findings while all three authors wrote the article.

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Conflict of interest. None.

Ethical standards. No approval of research ethics committees was required to accomplish the goals of this study because the specimen was examined by the authors when already dead.

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