

THE CAPTURE OF A LARGE PREDATORY SHARK, *CARCHARHINUS PLUMBEUS* (CHONDRICHTHYES: CARCHARHINIDAE), OFF THE TUNISIAN COAST (CENTRAL MEDITERRANEAN)

Emna SOUFI-KECHAOU

Université de Carthage, Institut National Agronomique de Tunisie, 43 avenue Charles Nicolle, 1082-Tunis-Mahrajène, Tunisia

Khadija OUNIFI-BEN AMOR & Jamila BEN SOUISSI

Université de Carthage, Institut National Agronomique de Tunisie, 43 avenue Charles Nicolle, 1082-Tunis-Mahrajène, Tunisia, Université de Tunis El Manar, Faculté des Sciences de Tunis, Laboratoire de Biodiversité, Biotechnologie et Changement Climatique, LR11ES09, 1002, Tunis, Tunisia

Mohamed Mourad BEN AMOR

Institut National des Sciences et Technologies de la Mer, port de pêche, 2025 La Goulette, Tunisia

Christian CAPAPÉ

Laboratoire d'Ichtyologie, case 104, Université de Montpellier, 34 095 Montpellier cedex 5, France
e-mail: capape@univ-montp2.fr

ABSTRACT

A large female sandbar shark Carcharhinus plumbeus (Nardo, 1827), measuring 3 m in total length and weighing 70 kg, was caught in the waters surrounding La Galite Island and the Cani Rocks located 100 km off Tabarka, a city in northern Tunisia. The specimen of C. plumbeus presented in this article is probably the largest and heaviest recorded to date, on a worldwide scale. Additionally, this record constitutes the northernmost extension of the species in Tunisian waters. The specimen could have migrated from western areas, such as the Algerian coast, where the species is still commonly captured, however, migration from Tunisian southern areas, mainly the Gulf of Gabès, which is considered a nursery area for sharks, cannot be totally ruled out either.

Key words: *Carcharhinus plumbeus*, description, distribution, expansion range, central Mediterranean

CATTURA DI UN GRANDE SQUALO PREDATORE, *CARCHARHINUS PLUMBEUS* (CHONDRICHTHYES: CARCHARHINIDAE), AL LARGO DELLA COSTA TUNISINA (MEDITERRANEO CENTRALE)

SINTESI

Una grande femmina di squalo grigio, Carcharhinus plumbeus (Nardo, 1827), di 3 m di lunghezza e 70 kg di peso, è stata catturata nelle acque circostanti l'isola La Galita e i galitoni dell'est, 100 km al largo di Tabarca, una città della Tunisia settentrionale. L'esemplare di C. plumbeus presentato nell'articolo è probabilmente il più grande e il più pesante mai incontrato su scala mondiale. Questo ritrovamento costituisce l'estensione più settentrionale della specie nelle acque tunisine. L'esemplare potrebbe essere migrato dalle aree occidentali, come la costa algerina, dove la specie è ancora comunemente catturata. Tuttavia, la migrazione dalle aree meridionali tunisine, principalmente dal golfo di Gabès, che è considerata un'area di nursery per gli squali, non può venir completamente esclusa.

Parole chiave: *Carcharhinus plumbeus*, descrizione, distribuzione, espansione, Mediterraneo centrale

INTRODUCTION

The sandbar shark *Carcharhinus plumbeus* (Nardo, 1827) is a migratory species distributed throughout the world. It is known in the Pacific and Indian Oceans, as well as on both sides of the Atlantic Ocean, where it is especially targeted (McAuley *et al.*, 2007). Off the coasts of western Africa, landings of *C. plumbeus* are frequently observed in fishing sites along the coast of

Senegal, intended for human consumption as fresh or dried meat (Diatta *et al.*, 2008).

C. plumbeus used to be reported throughout the Mediterranean, but it disappeared from the northern areas of the western Basin, most notably from the French coast (Capapé *et al.*, 2000). Conversely, the species is commonly caught in southern regions, such as the coasts of Algeria (Hemida *et al.*, 2002) and Tunisia (Saïdi *et al.*, 2005), and nursery grounds were observed in the

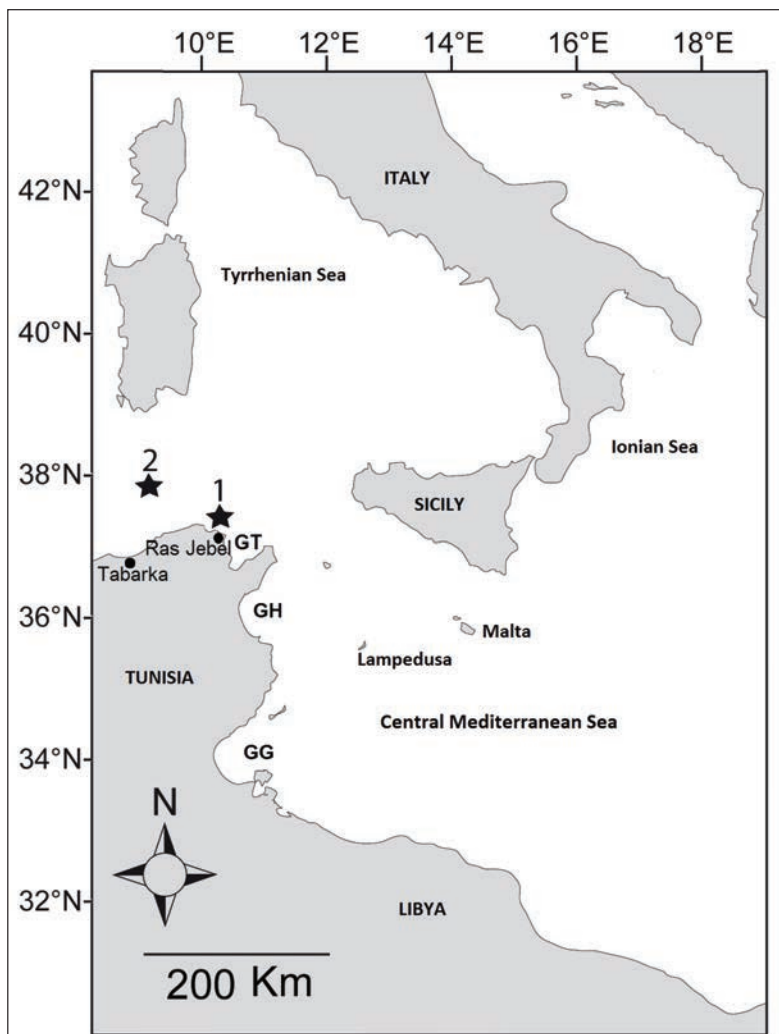


Fig. 1: Map of the central Mediterranean indicating two recent capture sites of *Carcharhinus plumbeus* off the northern Tunisian shores. **1.** In the waters surrounding the Cani Rocks off Ras Jebel (Rafrafi *et al.*, 2015). **2.** In the waters surrounding La Galite Island and the Cani Rocks off Tabarka (the present study). GT: Gulf of Tunis; GH: Gulf of Hammamet; GG: Gulf of Gabès.

Sl. 1: Zemljevid osrednjega Sredozemskega morja z označenimi lokalitetami, kjer je bil ujet sivi morski pes ob severni tunizijski obali: **1.** V vodah, ki obdajajo Cani Rocks blizu Ras Jebel (Rafrafi *et al.*, 2015). **2.** V vodah, ki obdajajo otok La Galite in Cani Rocks blizu Tabarke (pričujoče delo). GT: Tuniški zaliv; GH: Zaliv Hammamet; GG: Gabeški zaliv.



Fig. 2: The specimen of *Carcharhinus plumbeus* caught in the waters surrounding La Galite Island and the Cani Rocks off Tabarka.

Sl. 2: Primerek sivega morskega psa, ujetega v vodah, ki obdajajo otok La Galite in Cani Rocks blizu Tabarke.

latter area (Bradaï *et al.*, 2005; Saïdi *et al.*, 2005). Similar patterns were reported from the Adriatic Sea (Costantini & Affronte, 2003; Lipej *et al.*, 2008; Dragičević *et al.*, 2010) and the southern Aegean Sea, off southwestern Turkey (Bilecenoglu *et al.*, 2014).

Quignard and Capapé (1971) noted that *C. plumbeus* was abundantly caught in southern Tunisian areas, such as the Gulf of Gabès, but rather rarely in northern areas, the boundary of its range being the Gulf of Tunis. However, Rafrafi-Nouira *et al.* (2015) reported the capture of 3 specimens in the waters surrounding the Cani Rocks, off the city of Ras Jebel, indicating possible migration of *C. plumbeus* towards northern areas.

Through routine monitoring of Tunisian waters, which was established several decades ago, and, concomitantly, through a collaboration with experienced fishermen knowledgeable about the fishing grounds, we were informed that during a trawling survey carried out off the northern Tunisian coast in March 2015, a large female of *C. plumbeus* had been captured. The specimen is described in the present paper, with comments regarding the real status of the species in the area.

MATERIAL AND METHODS

The large female *C. plumbeus* was captured on 15 March 2015 in the waters surrounding La Galite Island and the Cani Rocks, located 100 km off the city of Tabarka, northern Tunisia, at 37°41'729" N and 8°91'815" E (Fig. 1). The specimen was caught by trawl on a rocky bottom, at an approximate depth of 200 m, together with teleost species belonging to the families Sparidae and Mullidae, crustacean species, such as the

striped prawn *Melicertus kerathurus* (Forskåll, 1775), and cephalopod, including the common octopus *Octopus vulgaris* Cuvier, 1797, the musky octopus *Eledone moschata* Cuvier, 1797 and the common squid *Loligo vulgaris* Lamarck, 1798.

The specimen was delivered to the fishery of Ezzahra, located in the Gulf of Tunis, where it was photographed, cut into pieces by retailers and rapidly sold out, making it impossible for us to collect any of its parts. Our observations were therefore made based on the information provided by the fishermen who caught the specimen and the available photograph (see Fig. 2).

RESULTS AND DISCUSSION

The specimen was identified as *C. plumbeus* based on some morphological traits cited by Capapé *et al.* (1979), Cadenat & Blache (1981), Garrick (1982), Branstetter (1984) and Compagno (1984), as follows: body stout, snout broadly rounded and short; first dorsal fin high, triangular, its origin over pectoral bases; pectoral fins broadly triangular, relatively long; interdorsal ridge present; colour grey to bronze on the upper surface, belly whitish.

The specimen of *C. plumbeus* presented in Figure 1 appears as a large female, and measurements carried out by fishermen confirm this impression: the specimen reached 3 m in total length (TL) and weighed 70 kg. Compagno (1984) speculated that the maximum TL for the species could be 3 m, but with no specimens available for confirmation he subsequently stated that 2,390 mm or less could be more suitable. Branstetter (1984) reported that *C. plumbeus* could reach 2,500 mm

in TL, but more commonly up to 2,200 mm. The largest specimen previously found in Tunisian waters measured 2,480 mm in TL (Capapé, 1984). Diatta *et al.* (2008) reported a capture of a female measuring 2,250 mm TL and weighing 64 kg from the coast of Senegal. Cadenat and Blache (1981) observed a female of 2,295 mm in TL, weighing 57 kg, and a pregnant female carrying near-term embryos weighing 70 kg and reaching 2,100 mm in TL. Therefore, the specimen of *C. plumbeus* presented in this article it is, to our best knowledge, the largest and heaviest ever recorded on a worldwide scale.

Capapé (1989) observed the occurrence of several species belonging to the genus *Carcharhinus* Blainville, 1816, in southern Tunisian areas and suggested that an inter- and intraspecific competition for food between the two species could not be ruled out completely. Therefore, migrations towards northern areas remain a viable hypothesis, as also corroborated by the records reported by Rafrafi-Nouira *et al.* (2015). However, these migrations cannot be explained exclusively by the pressure of interspecific competition, they are also a result of the climate change in Mediterranean waters (Francour *et al.*, 1994; Ben Raïs Lasram & Mouillot, 2009). Ouni-Ben Amor *et al.* (2016) showed that animal species previously unknown in the area and originating from distant regions, such as the Indo-Pacific and the eastern tropical Atlantic, have been recorded in Tunisian waters for several decades.

The present specimen represents the northernmost extension of *C. plumbeus* in Tunisian waters, and this finding could also be a result of migration from eastern areas, such as the Algerian coast, where the species is

still commonly captured (Hemida *et al.*, 2002). Consequently, a sustainable population of *C. plumbeus* that has successfully established along the Maghreb coast remains a viable hypothesis due to the richness and availability of prey off the northern Tunisian coast (Azouz, 1974). These patterns were confirmed by the fauna associated with the capture of this specimen. Molecular tools will have to be used to delineate the origin of this species, as in the case of the milk shark *Rhizoprionodon acutus* (Rüppell, 1837) caught in the central Mediterranean (Ben Amor *et al.*, 2016). However, a strict monitoring of *C. plumbeus* is necessary to avoid a depletion of this species in the Mediterranean, although nursery areas have been found in Tunisian waters (Bradaï *et al.*, 2005), and appear to have been discovered in the Adriatic Sea (Costantini & Affronte, 2003; Lipej *et al.*, 2008; Dragičević *et al.*, 2010) and Turkish waters (Bilecenoglu *et al.*, 2014), as well.

Carcharhinus plumbeus is considered an endangered species (Musick *et al.*, 2009), but the captures of specimens of different sizes in northern Tunisian areas indicate that the species has met conditions favourable enough to reproduce and develop, and can grow to a large size. Migrations from nearby areas, from the eastern tropical Atlantic, where the species is caught abundantly (Diatta *et al.*, 2008), and through the Strait of Gibraltar, enhance the recruitment of the species, which appears to be locally well established. The absence of similar patterns in other large Mediterranean shark species explains why these register a drastic decline, with some of them approaching risk of extinction in this sea (Ferretti *et al.*, 2008).

ULOV VELIKEGA PRIMERKA SIVEGA MORSKEGA PSA *CARCHARHINUS PLUMBEUS*
(CHONDRICHTHYES: CARCHARHINIDAE) V TUNIZIJSKIH VODAH
(OSREDNJE SREDOZEMSKO MORJE)

Emna SOUFI-KECHAOU

Université de Carthage, Institut National Agronomique de Tunisie, 43 avenue Charles Nicolle, 1082-Tunis-Mahrajène, Tunisia

Khadija OUNIFI-BEN AMOR & Jamila BEN SOUISSI

Université de Carthage, Institut National Agronomique de Tunisie, 43 avenue Charles Nicolle, 1082-Tunis-Mahrajène, Tunisia, Université de Tunis El Manar, Faculté des Sciences de Tunis, Laboratoire de Biodiversité, Biotechnologie et Changement Climatique, LR11ES09, 1002, Tunis, Tunisia

Mohamed Mourad BEN AMOR

Institut National des Sciences et Technologies de la Mer, port de pêche, 2025 La Goulette, Tunisia

Christian CAPAPÉ

Laboratoire d'Ichtyologie, case 104, Université de Montpellier, 34 095 Montpellier cedex 5, France
e-mail: capape@univ-montp2.fr

POVZETEK

V vodah blizu otoka La Galite in Cani Rocks približno 100 km oddaljenih od Tabarke v severni Tuniziji je bila ujeta velika samica sivega morskega psa *Carcharhinus plumbeus* (Nardo, 1827), ki je merila 3 m v dolžino in tehtala 70 kg. Avtorji domnevajo, da gre verjetno za enega največjih in najtežjih primerkov sivega morskega psa doslej ujetih na svetu. Poleg tega gre za najsevernejšo ugotovljeno lokaliteto za to vrsto v tunizijskih vodah. Primerek je lahko priplaval iz zahodnih predelov kot je npr. alžirska obala, kjer to vrsto še vedno pogosto ulovijo. Poleg tega avtorji ponujajo hipotezo, da primerek morda izvira iz južno-tunizijskih predelov, predvsem iz Gabeškega zaliva, ki je znan kot razmnoževalno okolje za sivega morskega psa.

Ključne besede: *Carcharhinus plumbeus*, opis, razširjenost, širjenje areala, osrednje Sredozemsko morje

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