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RECORDS OF THE SANDBAR SHARK *CARCHARHINUS PLUMBEUS*, (NARDO, 1827) IN THE GULF OF TRIESTE (NORTHERN ADRIATIC)

Lovrenc LIPEJ & Tihomir MAKOVEC

Marine Biological Station, National Institute of Biology, SI-6330 Piran, Fornače 41

Alen SOLDO

Institute of Oceanography and Fisheries, HR-21000 Split, Šetalište I. Meštrovića 63

Valter ŽIŽA

Piran Aquarium, SI-6330 Piran

ABSTRACT

*In October 2000, two juvenile sandbar sharks, *Carcharhinus plumbeus*, were caught in fishing nets in the waters off Piran (Gulf of Trieste). The first specimen, 71 cm long and weighing 2600 g, was caught by gillnet (called "cagnara"), suitable for catching small cartilaginous fish. The second specimen, measuring 81.5 cm in length and 3.600 g in weight, was accidentally entangled in the trammel net, used for catching flatfish. Morphometric data regarding both specimens are presented in this work.*

Key words: *Carcharhinus plumbeus*, sandbar shark, juveniles, occurrence, Northern Adriatic, Gulf of Trieste

TESTIMONIANZA DELLO SQUALO PLUMBEO *CARCHARHINUS PLUMBEUS* (NARDO, 1827) NEL GOLFO DI TRIESTE (NORD ADRIATICO)

SINTESI

*Nell'ottobre del 2000, due giovani esemplari di squalo plumbeo, *Carcharhinus plumbeus*, sono stati catturati con reti da pesca al largo di Pirano (Golfo di Trieste). Il primo esemplare, 71 cm in lunghezza e 2600 g di peso, è stato pescato con la "cagnara", una rete usata per la pesca di piccoli pesci cartilaginei. Il secondo esemplare, di 81,5 cm e 3600 g, è rimasto accidentalmente ingarbugliato nella "passalera", usata per la pesca di sogliole e passere. Nell'articolo vengono presentati i dati morfometrici per entrambi gli esemplari.*

Parole chiave: *Carcharhinus plumbeus*, squalo plumbeo, stadi giovanili, ritrovamento, Nord Adriatico, Golfo di Trieste

INTRODUCTION

There are very few recent reports on sharks known to have occurred in the Gulf of Trieste. The sandbar shark *Carcharhinus plumbeus* (Nardo, 1827) is one of the five species of the genus *Carcharhinus*, which are known to have been recorded in the Mediterranean Sea. This medium sized shark can be easily determined due to its rounded snout and quite large first dorsal fin, situated almost above the base of the pectoral fin (Fig. 1). The colour of the dorsal part is greyish or brownish, while the ventral part is white. Sandbar sharks are found in temperate and tropical waters throughout the world (Compagno, 1984b). They are bottom-dwelling sharks, inhabiting shallow coastal waters. Nardo (1827; In: Brusina, 1888) was the first to describe the sandbar shark caught in the Gulf of Venice.

Although the distribution map made by Branstetter (1984) indicates that this shark is absent in the Adriatic Sea, it has been reported in all recent publication with lists of Adriatic sharks (Jardas, 1996; Bello, 1999). Furthermore, Tortonese (1956) and Bini (1967) reported the sandbar shark even as "most common" in the Northern Adriatic. However, there are very scarce records of sandbar sharks in the Gulf of Trieste and in the entire Northern Adriatic. In this report we are presenting data on two juveniles of this species, caught in the waters off Piran. This is the first report on this shark in Slovene waters.

MATERIAL AND METHODS

Sandbar sharks were identified using the keys of Branstetter (1984) and Jardas (1996). They were measured and photographed at the Piran Aquarium on October 17th and 27th 2000. Body measurements were made with calliper to the nearest millimetre and with hand meter to the nearest 0.5 cm. Both specimens were weighed at the Piran fish market. The measurements were made according to the guidelines of Compagno (1984a) (Fig. 2). The first specimen, caught on October 17th, is kept in the collection of the National Institute of Biology - the catalogue number 16397 (curator B. Marčeta), whereas the second specimen is kept in the collection of the Piran Aquarium.

RESULTS AND DISCUSSION

The first *Carcharhinus plumbeus* was caught on 16th October 2000 in the Gulf of Trieste, 5 miles off Piran by a fisherman. The shark, a juvenile female, was brought alive to the Piran Aquarium, but perished on the very same day. It was caught by gillnet called "cagnara", suitable for catching small cartilaginous fish. The shark measured 71.0 cm in length and weighed 2600 g (Fig. 3). This is the first record of this species in Slovene coastal waters.

The second shark was caught on 27th October 2000 in the waters some 7 miles off Piran. It was accidentally entangled in the trammel net (called "passalera") used for fishing of flatfish and successively transported to the Piran Aquarium where it, unfortunately, died on the next day. The 81.5 cm long shark weighed 3600 g (Figs. 4, 5).

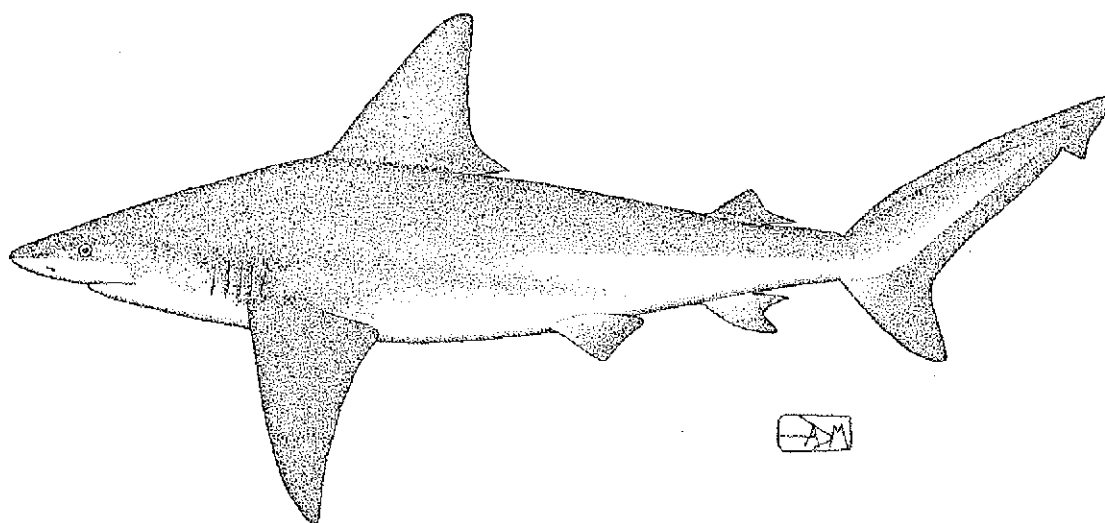


Fig. 1: Sandbar shark, *Carcharhinus plumbeus* (Drawing by A. De Maddalena).
Sl. 1: Sivi morski pes (*Carcharhinus plumbeus*) (Risba: A. De Maddalena).

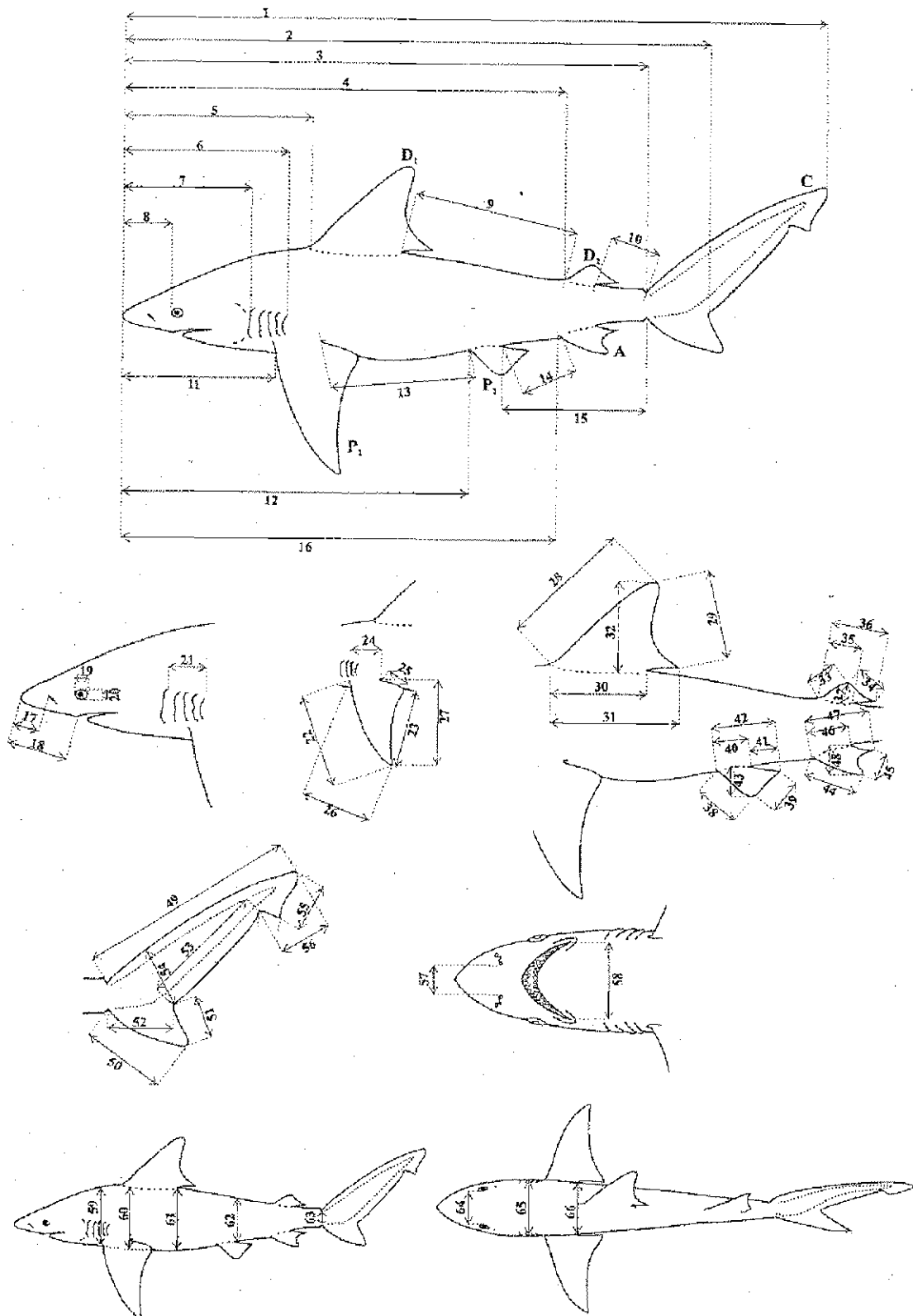


Fig. 2: Morphometric measurements (sensu Compagno, 1984a)
 Sl. 2: Morfometrične meritve (privzete po Compagno, 1984a).

Morphometric data regarding both specimens are presented in table 1.

Tab. 1: Measurements of different morphometric parameters of the two collected sandbar sharks *Carcharhinus plumbeus*, caught in October in the waters off Piran.

Tab. 1: Morfometrične meritve (v cm) dveh mladostnih osebkov sivega morskega psa (*Carcharhinus plumbeus*), ujetih v vodah blizu Pirana oktobra 2000 (vsi parametri so izraženi v centimetrih, teža (W) pa v g).

N	Parameter	1	2
W	Weight (g)	2.600	3.600
1	Total length (cm)	71.0	81.5
2	Fork length (cm)	57.5	66
3	Precaudal length (cm)	52.5	60.5
4	Pre-second dorsal length (cm)	45.0	51.0
5	Pre-first dorsal length (cm)	20.5	23.5
6	Head length (cm)	19.0	21.0
7	Prebranhial length (cm)	14.5	16.5
8	Preorbital length (cm)	5.5	7.5
9	Interdorsal space (cm)	16.5	17.5
10	Dorsal-caudal space (cm)	5.1	5.5
11	Prepectoral length (cm)	16.0	19.5
12	Prepelvic length (cm)	36.5	42.0
13	Pectoral-pelvic space (cm)	15.5	18.5
14	Pelvic-anal space (cm)	5.5	6.0
15	Pelvic-caudal space (cm)	13	14.2
16	Preanal length (cm)	45.5	-
17	Prenarial length (cm)	3.4	4.7
18	Preoral length (cm)	6.1	6.4
19	Eye length (cm)	0.9	1.2
20	Eye height (cm)	1.1	1.1
21	Intergill length (cm)	4.0	4.9
22	Pectoral anterior margin (cm)	12.0	13.3
23	Pectoral posterior margin (cm)	8.6	10.6
24	Pectoral base (cm)	4.6	5.5
25	Pectoral inner margin (cm)	3.3	4.5
26	Pectoral length (cm)	8.1	9.3
27	Pectoral height (cm)	8.8	10.6
28	First dorsal anterior margin (cm)	10.2	10.8
29	First dorsal posterior margin (cm)	8.3	9.8
30	First dorsal base (cm)	8.7	9.2
31	First dorsal length (cm)	11.6	12.3
32	First dorsal height (cm)	6.6	8.3
33	Second dorsal anterior margin (cm)	3.2	3.3

34	Second dorsal posterior margin (cm)	3.5	3.7
35	Second dorsal base (cm)	2.9	2.9
36	Second dorsal length (cm)	5.1	5.8
37	Second dorsal height (cm)	2.4	2.8
38	Pelvic anterior margin (cm)	3.6	4.7
39	Pelvic posterior margin (cm)	4.1	4.9
40	Pelvic base (cm)	2.9	2.9
41	Pelvic inner margin length (cm)	2.5	2.5
42	Pelvic length (cm)	5.4	6.5
43	Pelvic height (cm)	3.1	4.0
44	Anal anterior margin (cm)	4.0	5.1
45	Anal posterior margin (cm)	2.9	3.7
46	Anal base (cm)	2.9	3.4
47	Anal length (cm)	5.4	6.0
48	Anal height (cm)	2.6	3.3
49	Dorsal caudal margin (cm)	19.7	21.5
50	Preventral caudal margin (cm)	7.3	8.1
51	Lower postventral caudal margin (cm)	4.8	5.7
52	Caudal fork length (cm)	6.1	6.2
53	Upper postventral caudal margin (cm)	9.7	11.8
54	Caudal fork width (cm)	5.4	6.1
55	Terminal caudal margin (cm)	4.0	5.2
56	Terminal caudal lobe (cm)	4.7	5.5
57	Internarial space (cm)	4.5	4.7
58	Mouth width (cm)	7.1	7.7
59	Head height (cm)	10.0	10.4
60	Trunk height (cm)	12.0	14.3
61	Abdomen height (cm)	11.0	13.3
62	Tail height (cm)	7.6	7.7
63	Caudal peduncle height (cm)	3.0	3.1
64	Interorbital space (cm)	8.3	8.9
65	Head width (cm)	9.3	10.0
66	Trunk width (cm)	9.5	11.5

Jardas (1985, 1996) and Kovačić (1998) described the sandbar shark as a rare species, very seldom encountered in the Adriatic Sea. Lipej (1999) placed this species in the *Key for determination of vertebrates in Slovenia* (Kryštufek & Janžekovič, 1999) in accordance with the record of Graeffe (1888). By contrast, as pointed out in the introduction, Tortonese (1956) and Bini (1967) believe that this species is very common in the Northern Adriatic. Brusina (1888), who collected sample data on other Adriatic sharks, reported that this species was also common in the Gulf of Venice.

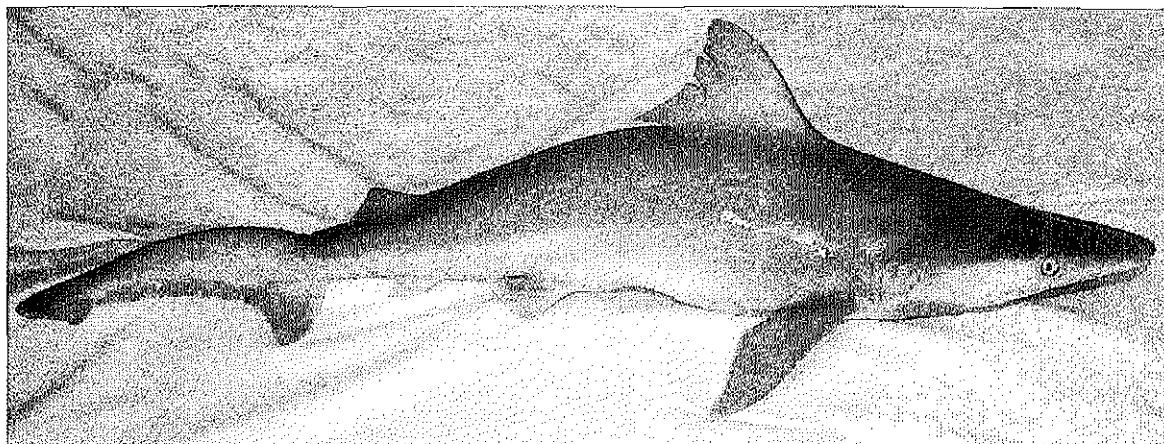


Fig. 3: Juvenile sandbar shark, caught on 16th October 2000 in the waters off Piran (Photo: L. Lipej).
Sl. 3: Mladič sivega morskega psa, ujet 16. oktobra 2000 v vodah nedaleč od Pirana (Foto: L. Lipej).

Kovačić (1998) reports that three specimens of the sandbar shark are kept in the collection of the Natural History Museum in Rijeka (Croatia). For two of them no data are available, while the third was caught near Zadar in 1903. Two of the specimens were adult males (catalogue numbers 13 and 14; 116 cm and 180 cm long, respectively), while the specimen from Zadar was a juvenile male (cat. No. 15; size = 78 cm) (M. Kovačić, *pers. comm.*). In the comprehensive survey of the recent ichthyofauna in the Rijeka Bay (Jardas *et al.*, 1998), there is no mention of this shark in the list of species.

In the ichthyological collection of the Institute of Oceanography and Fisheries in Split, where material sampled in the entire Adriatic area is kept, there are no specimens of the sandbar shark (Pallaoro & Jardas, 1996). Two specimens are housed in the Natural History Museum in Split, originating from the area of Split (Makarsko Primorje, Brački kanal), but without any concrete data (Onofri, 1983). One specimen is kept in the collection of the Croatian Natural History Museum in Zagreb, but again with no precise data (Pavletić, 1965).

According to Compagno (1984b), the size of the sandbar shark at birth varies from 56 to 75 cm; when reaching sexual maturity, it is from 130 to 180 cm long. Although the first caught female was 71 cm long and therefore well within this range, we believe the specimen to be a juvenile rather than a neonate, since we did not see any evident unhealed umbilical scar. By contrast, while this shark reproduces elsewhere in spring (Eastern Atlantic) and/or in summer months (American coast) (Compagno, *ibidem*), both studied specimens were caught in October. To this end, both specimens dealt with in this report should be treated as juveniles.

Actually, during the 4th European Elasmobranch Association meeting held in Livorno (Italy) from September 27th to 30th 2000, Costantini & Affronte (2000) presented some new data on the occurrence of four neonate sandbar sharks in the Northern Adriatic Sea. All of

them were caught during the summer period in 1998 and 1999 with the same nets as in our case.

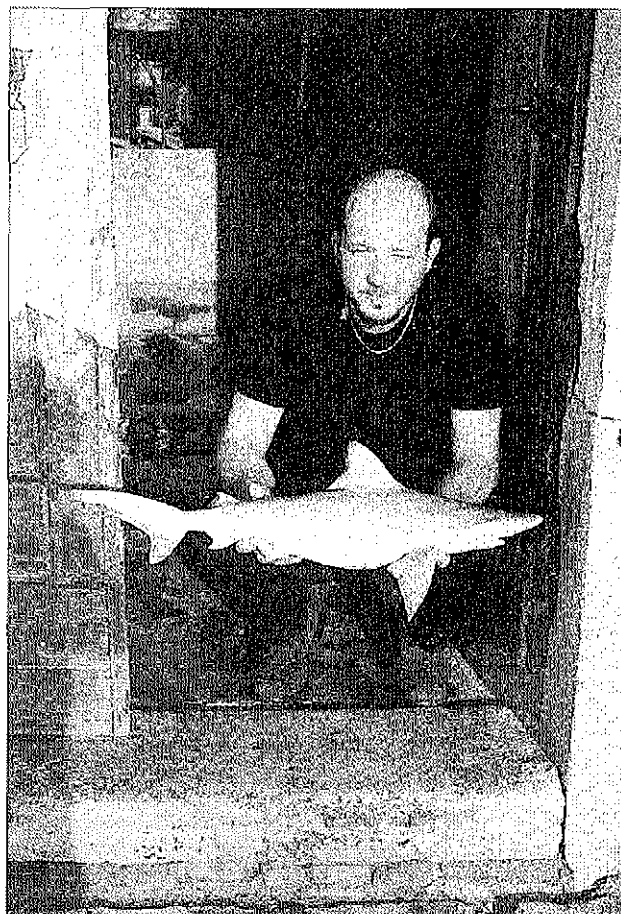


Fig. 4: Juvenile sandbar shark, caught on 27th October 2000 in the waters off Piran (Photo: L. Lipej).
Sl. 4: Mladič sivega morskega psa, ujet 27. oktobra 2000, v vodah nedaleč od Pirana (Foto: L. Lipej).

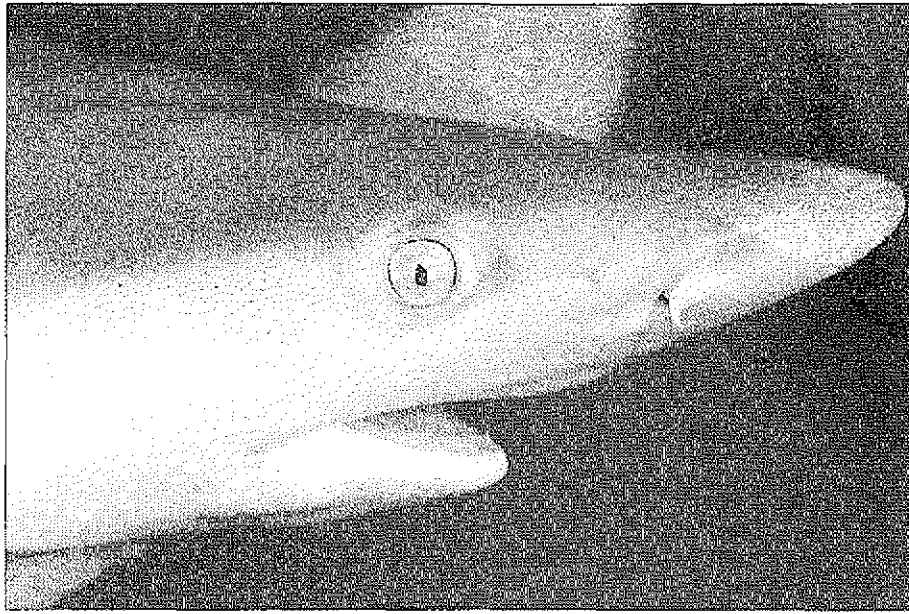


Fig. 5: Close-up photograph of the juvenile sandbar shark, caught on 27th October 2000. (Photo: L. Lipej).
Sl. 5: Mladič sivega morskega psa, ujet 27. oktobra 2000, fotografiran od blizu. (Foto: L. Lipej).

There are different possible explanations for the lack of data on the sandbar shark distribution in the Adriatic Sea: juvenile sandbar sharks have been occurring in the Northern Adriatic, for unknown reason, only since 1998, or it is quite possible that they have been frequently misidentified by fishermen with the small shark of the genus *Mustelus* (*M. mustelus* and *M. punctulatus*), which are known to be abundant in the area. They are more or less of the same colour and size, but of completely different shape. Sometimes the information regarding a capture of a peculiar shark species does not reach the ichthyologist or marine biologist. Bello (1999) reported on a specimen of *Odontaspis ferox*, which was butchered, dressed and skinned on board soon after capture in order to be sold at the local market as "palombo" - *Mustelus mustelus*. There is also the third possibility, *i.e.* that they are present, but only rarely caught in nets. Although the data on the sandbar shark in the Gulf of Trieste cover only the period of the last three years (our study and Costantini & Affronte, 2000), we suppose that this species is frequently confused with other sharks and also rarely found in the fishing nets. The juveniles inhabit shallow coastal nursery grounds

during the summer months (Compagno, 1984b), while the adults form separate schools.

Sandbar shark seem to be a rather common species in the middle Eastern Adriatic, since it can be commonly found at fish markets in different Dalmatian towns. Although the records for this species in the Adriatic were only rarely published, we believe that *Carcharhinus plumbeus* was neglected, probably due to misidentification, which is a common problem with other shark species as well (Soldo & Jardas, 2000). A further research is thus required to elucidate the status of this shark in the Adriatic.

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POJAVLJANJE SIVEGA MORSKEGA PSA, *CARCHARHINUS PLUMBEUS*, (NARDO, 1827), V TRŽAŠKEM ZALIVU (SEVERNI JADRAN)

Lovrenc LIPEJ & Tihomir MAKOVEC

Morska biološka postaja, Nacionalni Inštitut za biologijo, SI-6330 Piran, Fornace 41

Alen SOLDO

Inštitut za oceanografiju i ribarstvo, HR-21000 Split, Šetalište I. Mestrovića 63

Valter ŽIŽA

Akvarij Piran, SI-6330 Piran

POVZETEK

O sivem morskem psu v slovenskem obalnem morju praktično ni nobenih podatkov. To vrsto sicer navajajo v Ključu za določevanje vretenčarjev Slovenije, vendar na podlagi podatkov, starih več kot 100 let. Tudi sicer jo jadranski ihtiologi navajajo kot redko vrsto v Jadranskem morju. V vodah nedaleč od Pirana sta bila 16. in 27. oktobra ujeta dva mladiča sivega morskega psa (*Carcharhinus plumbeus*). Prvi je bil ujet v posebno mrežo za navadne morske pse iz rodu *Mustelus*, drugi pa v ribiško mrežo, s katerimi lovijo bokoplavutarice. Sodeč po velikosti obeh primerkov, ki sta merila 71 in 81,5 cm, gre za letošnje mladiče.

Spričo pomanjkanja podatkov o tej vrsti za severni Jadran je možnih več domnev. Verjetno je bila zaradi možnosti zamenjave z odraslimi osebki vrst iz rodu *Mustelus* ta vrsta doslej spregledana, povsem mogoče pa je tudi, da jo je zaradi bentoškega načina življenja težje ujeti. Glede na razpoložljive podatke iz zbirk v vzhodno-jadranskih naravoslovnih ustanovah je prva domneva po našem mnenju bolj verjetna. Zato bi bilo smiselno načrtno spremljati ulove ribičev in voditi evidenco o ulovljenih hrustančnicah.

Ključne besede: *Carcharhinus plumbeus*, sivi morski pes, mladostni osebki, pojavljanje, severni Jadran, Tržaški zaliv

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