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ON THE CAPTURE OF A YOUNG PORBEAGLE, *LAMNA NASUS* (BONNATERRE, 1788), IN THE WESTERN ADRIATIC SEA

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ABSTRACT

The authors report the capture of a young porbeagle *Lamna nasus* (Bonnaterre, 1788), on July 15th, 2001 in the central Adriatic Sea, off S. Benedetto del Tronto (Italy). Morphometric measurements and macrophotographs of the teeth are reported. The specimen was a female weighing 6.5 kg and measuring 91 cm in total length. Its stomach contained sardines, *Sardina pilchardus*. We estimated its age at 1 to 17 months. The specimen was included in the collections of the Museo Ittico Augusto Capriotti in San Benedetto del Tronto (cat. no. 1850).

Key words: porbeagle, *Lamna nasus*, sharks, Adriatic Sea

INTORNO ALLA CATTURA DI UN GIOVANE SMERIGLIO, *LAMNA NASUS* (BONNATERRE, 1788), NEL MARE ADRIATICO OCCIDENTALE

SINTESI

Viene riportata la cattura di un giovane esemplare di smeriglio *Lamna nasus* (Bonnaterre, 1788), avvenuta il 15 Luglio 2001 nel Medio Mare Adriatico, al largo di S. Benedetto del Tronto (Italia). Vengono presentati i dati morfometrici ed alcune macrofotografie della dentatura. L'esemplare era una femmina di 6.5 kg di peso e 91 cm di lunghezza totale. Il contenuto stomacale era costituito da sardine, *Sardina pilchardus*. L'età dell'individuo è stata stimata tra 1 e 17 mesi. L'esemplare è stato incluso nelle collezioni del Museo Ittico Augusto Capriotti di San Benedetto del Tronto (no. cat. 1850).

Parole chiave: smeriglio, *Lamna nasus*, squali, Mar Adriatico

INTRODUCTION

The porbeagle *Lamna nasus* (Bonnaterre, 1788) is a member of the Lamnidae Müller & Henle, 1838 family. It is a large species that can reach at least 300 cm and possibly to 370 cm in total length and at least 230 kg in weight (Castro, 1983; Compagno, 1984). It can be easily identified by its spindle-shaped body, strongly conical snout, lunate caudal fin, strong primary caudal keels and small secondary keels, teeth moderately large and blade-like with a pair of lateral cusplets, large rounded dark eyes, dark blue-grey to blackish coloration on the dorsal surface and white on the ventral surface, a conspicuous white rear tip of first dorsal fin (Castro, 1983; Compagno, 1984) (Fig. 1). The porbeagle is fast swimming mackerel shark, its speed and power can be explained by a complex blood vessel heat-exchanging arrangement: in fact, we could consider this condition as warm-bloodedness or endothermy, well known also in other mackerel sharks (Carey *et al.*, 1985). It feeds mainly on small pelagic schooling bony fishes, selachians, squids (Compagno, 1984). Porbeagle may take 5 or more years to reach maturity: in Northern Hemisphere males mature at about 150-200 cm total length, while females at about 218-229 cm (Francis & Stevens, 2000). Its mode of reproduction is aplacental viviparity and embryos are nourished by oophagy. The gestation period is 8-9 months (Francis & Stevens, 2000), and in the North Atlantic birth occurs in spring and summer (Castro, 1983; Francis & Stevens, 2000); litter size is 2-5 (usually 4), and size at birth is 68-89 cm total length (Francis & Stevens, 2000; Mollet, 2001). Porbeagle is an important object of commercial fisheries all around the world for its high-quality meat, mainly caught on pelagic longlines, and also highly considered for sport-fishery. The intensive fishery greatly reduced the population of porbeagle in the North Atlantic Ocean and the Mediterranean Sea (Castro, 1983; Compagno, 1984; Moreno, 1995; Vannuccini, 1999; Watts, 2001). In Italy, where porbeagle

meat is widely eaten and usually marketed as "palombo" (smooth-hound, *Mustelus* sp.), it's mainly imported frozen or fresh from North-eastern Atlantic Countries and Japan (De Maddalena & Piscitelli, 2001).

Porbeagle is a littoral and epipelagic species that prefers waters colder than 18°C (Aasen, 1963). Widely distributed in the cold temperate waters of the North Atlantic, South Atlantic, South Indian and South Pacific Oceans. In the Mediterranean, it is indicated as rare or very rare in all waters (Tortonese, 1938; Capapé, 1989; Barruol *et al.*, 1999; Buencuerpo *et al.*, 1998); while only in the waters off North-western Sicily, it is reported as small common (A. Celona, *pers. comm.*). Muñoz-Chápoli (1984) examined 67 specimens caught during 1981 in an area of the East-central Atlantic Ocean and Alboran Sea: founding only specimens over 119 cm in length, he hypothesized that porbeagle don't reproduce at our latitudes. Recently Orsi Relini & Garibaldi (2001) reported capture of 3 young specimens under 1 m-TL from the Ligurian Sea. In the Adriatic Sea captures of porbeagle were ever been particularly rare (Tortonese, 1956; Palaoro & Jardas, 1996; Soldo & Jardas, 2001; L. Lipej, *pers. comm.*). In the eastern Adriatic only 5 specimens were recorded after 1950, last being dated September 1993 (Soldo & Jardas, 2001; A. Soldo, *pers. comm.*). Therefore we consider it particularly interesting to report the recent capture of a very young specimen in the west-central Adriatic Sea.

MATERIALS AND METHODS

We collected data on the location of capture and gear from the angler who caught the shark. The porbeagle, brought to the Museo Ittico Augusto Capriotti in San Benedetto del Tronto, was then prepared by the taxidermist Mr. Sergio Giacoia, and added to the collection with the catalogue number 1850. The specimen was examined by one of the authors (M.M.) and detailed morphometric measurements were taken using a digital

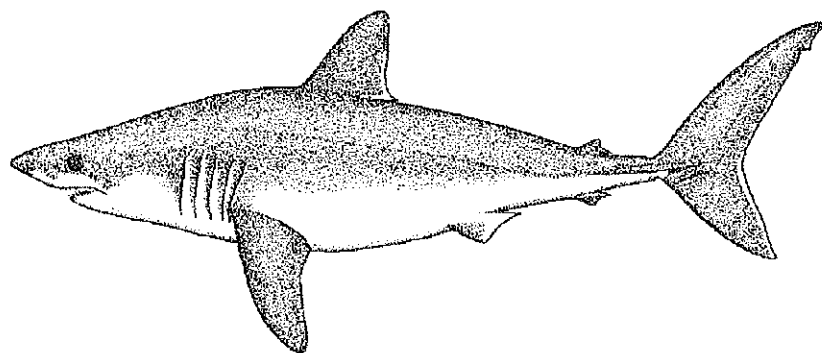


Fig. 1: Porbeagle *Lamna nasus* (Bonnaterre, 1788). (Drawing: A. De Maddalena)
Sl. 1: Atlantski skušolovec *Lamna nasus* (Bonnaterre, 1788). (Risba: A. De Maddalena)

calypter. For the body measurements we used Compagno's guidelines (1984), while teeth were measured according to Mollet *et al.* (1996). The tooth's total height was measured, indicated as H in Mollet *et al.* (1996), that is, total crown and root height, and we considered anterior, intermediate and the last reachable lateral or posterior teeth (measurements were effected on the taxidermy-mounted specimen). Moreover some macrophotographs of the teeth were taken.

RESULTS AND DISCUSSION

On Sunday, July 15th 2001, a young specimen of porbeagle was caught along the Italian coast of the west-central Adriatic Sea, 90° East of S. Benedetto del Tronto (AP), 15 miles offshore (Figs. 2, 3). The shark was captured with big game rod and reel equipment by a sport fisherman, Mr. Piero Crescenzi. The shark was hooked at a depth of 35 m, on a sea floor 85 m deep. It was 10:35 a.m., with a smooth sea and clear weather.

The specimen was a young female weighing 6.5 kg and measuring 91 cm in total length. Its stomach content was 8 sardines, *Sardina pilchardus*, some probably from chum. Minute irregular cusplets, but noticeably smaller than in adult, were observable at the base of some upper lateral teeth, while other teeth lack these lateral denticles (this characteristic is shown even in the photos; Figs. 4, 5). The shape of teeth is much more

similar to the shortfin mako *Isurus oxyrinchus* Rafinesque, 1810 than in adult. Coloration was blackish on the dorsal surface and metallic blue-grey on the flank and the side of head; caudal fin was light in the middle with conspicuous black margins, moreover its posterior margin had a narrow white band. The white rear tip of first dorsal fin was well evident.

Francis & Stevens (2000) reported that juvenile porbeagles grow linearly and rapidly, 16-20 cm per year. On the basis of this data, considering the 91 cm shark total length, we can hypothesize about its age. So with 68-89 cm total length for the size at birth, our specimen had to be 1 to 17 months old and had to be born February 2000 to early June 2001.

Porbeagle is a quite mobile species, capable to move on long distance in short periods. We can only hypothesize that, if compared to adult specimens, young may have less well-developed temperature control which limits their extension into colder water: probably young age groups don't move very far, while as they get bigger we would expect them to start migrating further (J. D. Stevens, *pers. comm.*). Therefore it is not possible to know if this young specimen could be born in an area close where it has been captured, or even in the Adriatic Sea, but we can hypothesize that it could be born in Mediterranean waters.

Measurements on body and teeth are presented in tables 1 and 2.

Tab. 1: Measurements of the young porbeagle *Lamna nasus* (Bonnaterre, 1788), caught on July 15th 2001 off S. Benedetto del Tronto (Italy, Western Adriatic Sea). Measurements are given in centimetres.

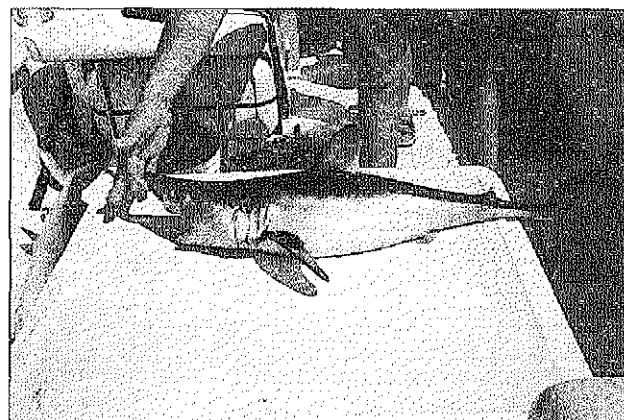
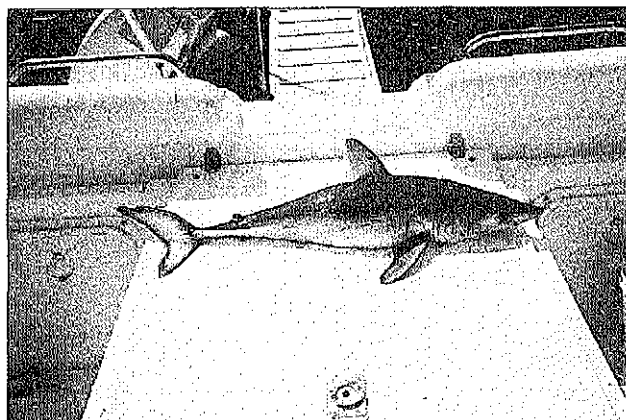
Tab. 1: Mjere mladega atlantskega skušolovca *Lamna nasus* (Bonnaterre, 1788), ujetega 15. julija 2001 v bližini mesta S. Benedetto del Tronto (Italija, zahodni Jadran). Vse mere so v cm.

TOT	total length	91.0 cm	CPV	preventral caudal margin	12.5 cm
FOR	fork length	80.0 cm	D1L	first dorsal length	10.5 cm
PRC	precaudal length	74.2 cm	D1A	first dorsal anterior margin	11.3 cm
PD2	pre-second dorsal length	65.6 cm	D1B	first dorsal base	9.2 cm
PD1	pre-first dorsal length	31.3 cm	D1H	first dorsal height	7.6 cm
HDL	head length	24.1 cm	D2L	second dorsal length	3.4 cm
PG1	prebranchial length	16.7 cm	D2A	second dorsal anterior margin	2.4 cm
PSP	prespiracular length	10.4 cm	D2B	second dorsal base	1.4 cm
POB	preorbital length	4.9 cm	D2H	second dorsal height	1.4 cm
PP1	prepectoral length	21.6 cm	P2L	pelvic length	7.1 cm
PP2	prepelvic length	47.2 cm	P2A	pelvic anterior margin	3.6 cm
PAL	preanal length	63.0 cm	P2B	pelvic base	2.7 cm
PRN	preanarial length	5.4 cm	P2H	pelvic height	1.9 cm
POR	preoral length	1.8 cm	ANL	anal length	3.8 cm
EYL	eye length	2.3 cm	ANA	anal anterior margin	2.8 cm
P1A	pectoral anterior margin	15.3 cm	ANB	anal base	1.7 cm
P1B	pectoral base	5.1 cm	ANH	anal height	1.4 cm
P1H	pectoral height	11.6 cm	MOW	mouth width	6.3 cm
CDM	dorsal caudal margin	19.1 cm	INW	internarial space	3.1 cm

Tab. 2: Measurements of the teeth of the young porbeagle *Lamna nasus* (Bonnaterre, 1788), caught on July 15th 2001 off S. Benedetto del Tronto (Italy, Western Adriatic Sea). Measurements are given in millimetres.

Tab. 2: Mere zob mladega atlantskega skušolovca *Lamna nasus* (Bonnaterre, 1788), ujetega 15. julija 2001 v bližini mesta S. Benedetto del Tronto (Italija, zahodni Jadran). Mere so v mm.

RIGHT UPPER JAW		LEFT UPPER JAW	
1 st anterior tooth height (UA1H)	7.85 mm	1 st anterior tooth height (UA1H)	7.81 mm
2 nd anterior tooth height (UA2H)	8.63 mm	2 nd anterior tooth height (UA2H)	8.21 mm
intermediate tooth height (UIH)	4.24 mm	intermediate tooth height (UIH)	4.22 mm
1 st lateral tooth height (UL1H)	6.56 mm	1 st lateral tooth height (UL1H)	6.61 mm
2 nd lateral tooth height (UL2H)	6.86 mm	2 nd lateral tooth height (UL2H)	6.80 mm
3 rd lateral tooth height (UL3H)	5.75 mm	3 rd lateral tooth height (UL3H)	5.67 mm
4 th lateral tooth height (UL4H)	5.27 mm	4 th lateral tooth height (UL4H)	5.19 mm
5 th lateral tooth height (UL5H)	4.63 mm	5 th lateral tooth height (UL5H)	4.67 mm
1 st posterior tooth height (UP1H)	3.81 mm	1 st posterior tooth height (UP1H)	3.86 mm
RIGHT LOWER JAW		LEFT LOWER JAW	
1 st anterior tooth height (LA1H)	9.88 mm	1 st anterior tooth height (LA1H)	9.90 mm
2 nd anterior tooth height (LA2H)	10.16 mm	2 nd anterior tooth height (LA2H)	10.12 mm
3 rd anterior tooth height (LA2H)	6.79 mm	3 rd anterior tooth height (LA2H)	6.80 mm
1 st lateral tooth height (LL1H)	6.48 mm	1 st lateral tooth height (LL1H)	6.57 mm
2 nd lateral tooth height (LL2H)	6.11 mm	2 nd lateral tooth height (LL2H)	6.13 mm
3 rd lateral tooth height (LL3H)	5.64 mm	3 rd lateral tooth height (LL3H)	5.69 mm
4 th lateral tooth height (LL4H)	5.01 mm	4 th lateral tooth height (LL4H)	4.97 mm
5 th lateral tooth height (LL5H)	4.41 mm	5 th lateral tooth height (LL5H)	4.43 mm



Figs. 2, 3: Young porbeagle *Lamna nasus*, caught on July 15th 2001 off S. Benedetto del Tronto (Italy, Adriatic Sea). (Photo: P. Crescenzi)

Sl. 2, 3: Mladi atlantski skušolovec *Lamna nasus*, ujet 15. julija 2001 v bližini mesta S. Benedetto del Tronto (Italija, Jadransko morje). (Foto: P. Crescenzi)

CONCLUSIONS

It is certain that many shark species inhabiting the Mediterranean Sea were strongly threatened by increased fisheries due to inefficient fishery regulation. Shark populations are in fast regression due to overfishing, often of immature individuals, mainly by longlines such as those used in tuna and swordfish capture, and also due to overfishing of their prey. This threat is particularly evident for large species such as the shortfin

mako (*Isurus oxyrinchus*), the blue shark (*Prionace glauca*), the sandbar shark (*Carcharhinus plumbeus*), the great white shark (*Carcharodon carcharias*) and the porbeagle. Sharks in general, because of their low reproduction rate and late sexual maturity age (see Compagno, 1984), are very sensitive to fishing pressure. This situation in the Mediterranean and worldwide has been denounced by reports of many researchers (see regional reports such as those of Capapé, 1989; Buencuerpo *et al.*, 1998; Soldo & Jardas, 2001; De Maddalena & Piscitelli, 2001, as well as global works such as Vannuc-

cini, 1999; Watts, 2001). Unfortunately, institutions responsible for fishery management still are extremely slow in giving the necessary response to increased fish-

ing pressure, risking the complete disappearance of some of the most important predators of our marine fauna.



Fig. 4: Upper anterior, intermediate and lateral teeth of the same porbeagle specimen. (Photo: N. Polini & M. Marconi)

Sl. 4: Zgornji prednji, vmesni in stranski zobje istega atlantskega skušolovca. (Foto: N. Polini & M. Marconi)

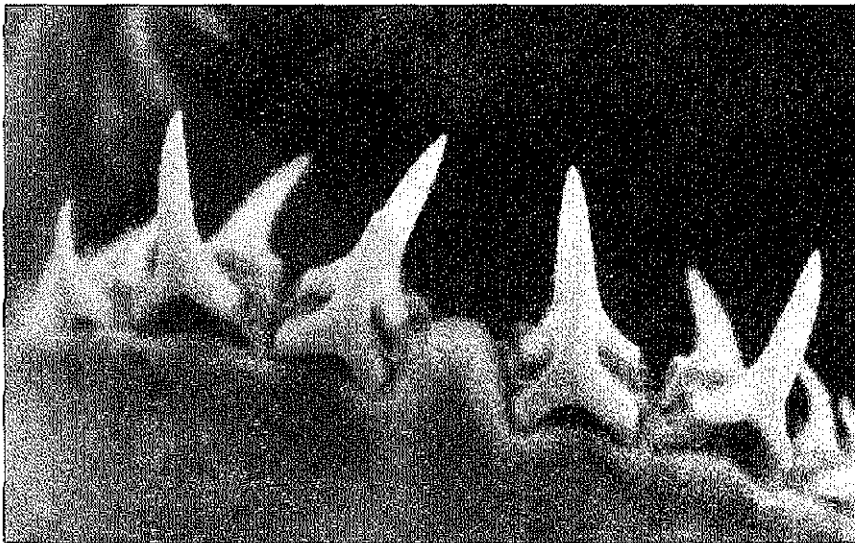


Fig. 5: Lower anterior teeth of the same porbeagle specimen. (Photo: N. Polini & Mario Marconi)
Sl. 5: Spodnji prednji zobje istega atlantskega skušolovca. (Foto: N. Polini & M. Marconi).

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advice. Thanks to Sheila Beatty for her review of the English text. Special thanks to Nazzareno Polini, skillfull naturalist and photographer, who helped us take macrophotographs, and to the angler Piero Crescenzi for having promptly recognized a rare and important specimen of the Adriatic ichthyological fauna and donated it to the Museo Ittico A. Capriotti. Finally thanks to the two referees for their suggestions.

O MLADEM ATLANTSKEM SKUŠOLOVCU *LAMNA NASUS* (BONNATERRE, 1788),
UJETEM V ZAHODNEM JADRANU

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POVZETEK

Avtorja pričujočega članka poročata o mladem atlantskem skušolovcu *Lamna nasus* (Bonnaterre, 1788), ujetem 15. julija 2001 v srednjem Jadranu v bližini italijanskega mesta S. Benedetto del Tronto. Predstavljene so morfološke meritve in makrofotografije zob ujete samice, težke 6,5 kg in dolge 91 cm. V njenem želodcu so našli sardine *Sardina pilchardus*. Avtorja ocenjujeta, da je bil osebek, ki je postal del zbirke v Museo Ittico Augusto Capriotti v mestu San Benedetto del Tronto (kat. št. 1850), star med 7 in 17 meseci.

Ključne besede: atlantski skušolovec, *Lamna nasus*, morski psi, razmnoževanje, Jadransko morje

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