

A GRAVID FEMALE BRAMBLE SHARK, *ECHINORHINUS BRUCUS* (BONNATERRE, 1788), CAUGHT OFF ELBA ISLAND (ITALY, NORTHERN THYRRHENIAN SEA)

Alessandro DE MADDALENA

Italian Great White Shark Data Bank, I-20145 Milano, via L. Ariosto 4

E-mail: ademaddalena@tiscalinet.it

Marco ZUFFA

Museo Archeologico "Luigi Donini", I-40064 Ozzano dell'Emilia, via Prunaro 1

ABSTRACT

A female bramble shark, *Echinorhinus brucus* (Bonnaterre, 1788), estimated to be about 250 cm long, was caught around 1985 off Capo Bianco, Elba Island, Italy (western Mediterranean Sea). Dissection revealed at least 13 ova, measuring 8-10 cm in diameter. A list of 24 *E. brucus* specimens recorded from the Mediterranean Sea is presented, including historical and contemporary records. Most specimens (45.8%) have been reported from the Ligurian and Northern Tyrrhenian Seas; we hypothesize that *E. brucus* could reproduce in this area. The sex ratio is 1 : 3.3 males to females. A total of 11 *E. brucus* specimens are preserved in 9 European Natural History Museums. A 296 cm long female caught in 1856 off Nice, France, is close to the maximum size of this species, and a 258 cm male on display at Pavia Museum of Zoology is the largest of any Mediterranean specimen presently preserved. *E. brucus* is very rare in the Mediterranean and needs immediate protection in the entire area.

Key words: bramble shark, *Echinorhinus brucus*, reproduction, distribution, Mediterranean Sea

UNA FEMMINA GRAVIDA DI RONCO SPINOSO, *ECHINORHINUS BRUCUS* (BONNATERRE, 1788), CATTURATA NELLE ACQUE DELL'ISOLA D'ELBA (ITALIA, MARE TIRRENO SETTENTRIONALE)

SINTESI

Una femmina di ronco spinoso, *Echinorhinus brucus* (Bonnaterre, 1788), di circa 250 cm di lunghezza, fu catturata intorno al 1985 al largo di Capo Bianco, Isola d'Elba, Italia (Mare Mediterraneo occidentale). La dissezione rivelò almeno 13 uova di 8-10 cm di diametro. Viene presentata una lista di 24 esemplari di *E. brucus* catturati nel Mediterraneo in tempi storici e recenti. La maggior parte di esemplari (45.8%) sono stati registrati nei Mari Ligure e Tirreno Settentrionale; si ipotizza che *E. brucus* potesse riprodursi in quest'area. Il rapporto tra i sessi è di 1 : 3.3 = maschi : femmine. Un totale di 11 esemplari di *E. brucus* è conservato in 9 Musei Europei di Storia Naturale. Una femmina di 296 cm pescata nel 1856 al largo di Nizza, Francia, è vicina alla dimensione massima di questa specie, e un maschio di 258 cm del Museo di Zoologia di Pavia è il più grande esemplare Mediterraneo conservato attualmente. *E. brucus* è estremamente raro nel Mediterraneo e necessita immediata protezione nell'intera area.

Parole chiave: ronco spinoso, *Echinorhinus brucus*, riproduzione, distribuzione, Mare Mediterraneo.

INTRODUCTION

The bramble shark, *Echinorhinus brucus* (Bonnaterre, 1788) (Order Squaliformes, family Echinorhinidae), can be identified by its large and pointed dermal denticles (both singles and multiples, measuring up to 2.5 cm and widely spaced), stout body, massive caudal peduncle, lack of the anal fin, two dorsal fins (the origin of the first dorsal fin over pelvic fins), large pelvic fins, short pectoral fins, caudal fin without a posterior notch and with short lower lobe, long snout, large eyes, wide parabolic mouth, wide nostrils, small spiracles and 5 pairs of relatively small gill slits. Dorsal surfaces are dark grey, grey-brown to purple-reddish, with metallic hues and sometimes with black or reddish spots; ventral surfaces are lighter or whitish; dermal denticles are whitish. Both upper and lower teeth are relatively small, with a low oblique cusp and 2-4 cusplets. The dental formula is 10 to 13-10 to 13 / 11 to 1-1 to 14 (Fowler, 1936; Bigelow & Schroeder, 1948; Tortonese, 1956; Cadenat & Blache, 1981; Castro, 1983; Compagno, 1984; Last & Stevens, 1994; Moreno, 1995; De Maddalena, 2001; Barrull & Mate, 2002). The bramble shark's maximum size is about 310 cm (Compagno, 1984). Males mature at a length between 150 and 174 cm and females between 213 and 231 cm (Compagno, 1984). An aplacental viviparous species, the bramble shark has a litter size of 15 to 24 (Castro, 1983; Compagno, 1984). The gestation period is unknown. The size at birth is 29-90 cm (Compagno, 1984). This cartilaginous fish feeds on small sharks, bony fishes, cephalopods and crustaceans (Compagno, 1984; Moreno, 1995). The bramble shark is a timid and slow swimming species and usually occurs singly. This animal lives near or above the bottom on the continental and insular shelves and upper slopes, at depths between 18 and 900 m (Compagno, 1984).

The bramble shark's distribution includes the central and western Mediterranean Sea, Atlantic, Indian and Western Pacific Oceans (Cadenat & Blache, 1981; Compagno, 1984; Bauchot, 1987). Bramble sharks are characteristically rare in the entire Mediterranean Sea (Canestrini, 1874; Parona, 1898; Lo Bianco, 1909; Vinciguerra, 1923; Tortonese, 1938, 1956; Granier, 1964; Capapé, 1989; Barrull & Mate, 2002; Hemida & Capapé, 2002) and therefore difficult to study. As a result, little is known about their biology, ecology and behaviour. Our knowledge of reproduction in bramble sharks is rudimentary and few reports exist describing pregnant female of this species. We therefore report herewith on the capture of a gravid female *E. brucus* and present a list of specimens recorded from the Mediterranean Sea, in order to contribute to the knowledge of the bramble shark's reproduction and distribution.

MATERIAL AND METHODS

This report is one of the various regional initiatives

that began following the formation of the Mediterranean Shark Research Group (MSRG), with the authors of this article being its active members. The collection of data concerning interesting captures and sightings of sharks along the Mediterranean coasts is conducted primarily by maintaining contacts with commercial fishermen, sport fishermen, divers, fish markets, researchers and marine life enthusiasts in the Mediterranean area. Through these contacts, substantial information on historical and recent records of sharks from the Mediterranean Sea are regularly collected.

Information concerning the capture and photographic evidence of a bramble shark caught off Elba Island were made available to us through Mr. Giuliano Chiocca. The picture is not of high quality mainly due to its poor reproduction. For this reason it is not possible to clearly observe some characteristics, such as dorsal fins' shape and ventral surfaces' colouration. Moreover, pectoral fins look strangely deformed, bent or damaged. Nevertheless, the species portrayed can be easily identified. Diagnostic features that are well visible on the photograph include: large and pointed dermal denticles on the dorsal surfaces, very massive caudal peduncle, lack of the anal fin, large pelvic fins, short caudal fin lower lobe, long snout, large eyes, wide parabolic mouth, evident labial furrows, wide nostrils nearly midway from mouth in preoral, upper and lower teeth with a low oblique cusp.

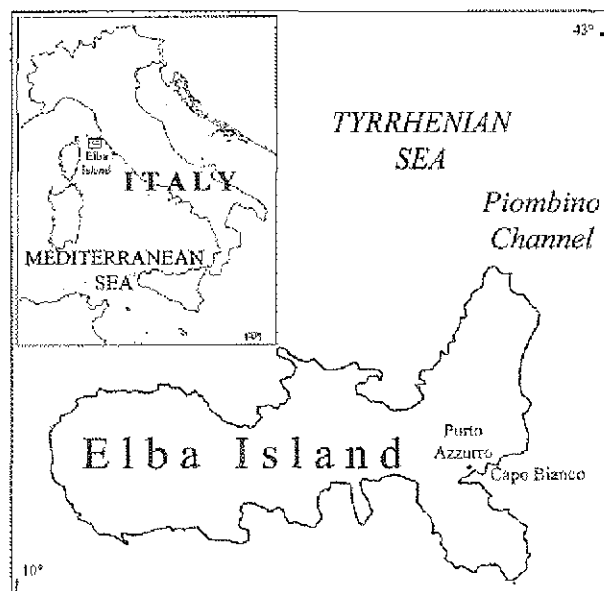


Fig. 1: Map of Elba Island (Italy, western Mediterranean Sea), showing the location of the gravid bramble shark capture presented in this work. (Drawing: A. De Maddalena)

Sl. 1: Zemljevid Elbe (Italija, zahodno Sredozemlje) z označeno lokacijo, na kateri je bila ujeta breja samica bodičastega morskega psa, predstavljenega v tem članku. (Risba: A. De Maddalena)

The species identification has been verified through comparison with photographs of a bramble shark caught off Annaba, Algeria (Hemida & Capapé, 2002) and three taxidermied specimens preserved in the Natural History Museums of Calci, Genoa, Italy and Prague, Czech Republic.

An additional search for historical and recent data on bramble sharks from the Mediterranean was effected by bibliographical research, location and study of materials preserved in Natural History Museums. For every case, whenever possible, the following data were collected: date and location of the capture, total length, weight and sex of the specimen, information on specimens preserved in museums and catalogue number in the collections.

RESULTS AND DISCUSSION

A mature female bramble shark was caught by fishermen around 1985, between April and May, off Elba Island, in the Northern Tyrrhenian Sea (western Mediterranean Sea), Italy. She was caught in a net, at a depth of 70-80 m, off Capo Bianco (about 1 km north of Porto Azzurro), along the Eastern coast of Elba Island (G. Chiocca, *pers. comm.*) (Fig. 1). The specimen had a considerably distended belly. Dissection revealed numerous large ova.

The capture is supported by photographic evidence (Fig. 2). In fact, a colour photograph shows the shark lying inverted next to fisherman Raffaello Buono (a relative of one of the fishermen that caught the shark). We estimated the shark's length based on the size of Raffaello Buono, appearing in a bent over position on the photo (on the right side of the shark), and also on the size of the feet of three persons standing on the left side of the animal. We concluded that the bramble shark was about 250 cm total length. The source indicated an approximate weight of about 200 kg (G. Chiocca, *pers. comm.*) that, in our opinion, seems slightly exaggerated. The photograph shows the female bramble shark partially eviscerated. A number of large ova, at least 13, are well visible on the picture. We estimated the ova diameter was approximately 8-10 cm. The length of this pregnant female and her litter size fall within the range already known.

A list of *E. brucus* specimens recorded from the Mediterranean Sea is presented in Table 1. A total of 24 captures were available among historical and contemporary records (Fig. 3). For each specimen, the following data are reported: capture date, capture location, sex (M or F), total length in cm, weight in kg, data source and additional notes including catalogue number (Cat. No.) in the museum collections.

Most bramble shark specimens (11 or 45.8%) have been reported from the Ligurian and Northern Tyrrhenian Seas. Only 2 gravid females were recorded, both caught in Tyrrhenian Sea, in the Messina Strait and off

Elba Island, in 1937 and around 1985. An interesting detailed description of a 29.5 cm bramble shark embryo was given by Cipria (1937). No new-born specimen was recorded, with the possible exception of two specimens caught off Camogli, Italy, in 1951 and 1953. Therefore we can only hypothesize that *E. brucus* could reproduce in the Mediterranean Sea, perhaps in Ligurian and Tyrrhenian waters. Of the 24 specimens, 10 were females, 3 males and 11 of unknown sex. The sex ratio is 1 : 3.3 males to females. This numerical dominance of females may indicate some form of sex segregation, however, a large sample of adults is required before drawing any such conclusions.

Bramble sharks are rarely caught by professional fishermen operating in the study area, and are taken only as bycatch, caught accidentally while fishing for other commercial species. In the Mediterranean countries, *E. brucus* is considered of no importance for fishery.



Fig. 2: Approximately 250-cm female bramble shark, *Echinorhinus brucus* (Bonnaterre, 1788), caught off Elba Island, around 1985.

Sl. 2: Približno 250 cm dolga samica bodičastega morskega psa *Echinorhinus brucus* (Bonnaterre, 1788), ujeta okrog leta 1985 v bližini Elbe.

**Tab. 1: Bramble sharks, *Echinorhinus brucus* (Bonnaterre, 1788), caught in the Mediterranean Sea.
Tab. 1: Bodičasti morski psi, *Echinorhinus brucus* (Bonnaterre, 1788), ujeti v Sredozemskem morju.**

| Date | Location | Sex | Length (cm) | Weight (kg) | Source | Notes |
|------------------------|----------------------------------|-----|-------------|--------------|--------------------------------------|--|
| 1798 | Nice (France) | - | - | 200 | Risso (1810) | - |
| 1856 | Nice (France) | F | 296 | - | Tortonese (1938) | Once preserved taxidermied in Milan Museum of Natural History (Cat. No. 2008). |
| May 1870 | Palermo (Sicily, Italy) | - | - | - | Doderlein (1881), Sarà & Sarà (1990) | Once preserved taxidermied in Palermo Museum of Zoology. Maybe this is the one specimen still preserved in the museum (Cat. No. P. 517 Coll. Doderlein). |
| July 1872 | Palermo (Sicily, Italy) | - | - | - | Doderlein (1881), Sarà & Sarà (1990) | Once preserved taxidermied in Palermo Museum of Zoology. Maybe this is the one specimen still preserved in the museum (Cat. No. P. 517 Coll. Doderlein). |
| April 1874 | Palermo (Sicily, Italy) | - | - | - | Doderlein (1881), Sarà & Sarà (1990) | Once preserved taxidermied in Palermo Museum of Zoology. Maybe this is the one specimen still preserved in the museum (Cat. No. P. 517 Coll. Doderlein). |
| May 1876 | Livorno (Italy) | F | - | - | Vanni (1992) | Preserved taxidermied in Florence Museum of Zoology "La Specola" (Cat. No. 6041). |
| 5 May 1877 | Kvarner Gulf (Croatia) | M | 162 (145) | - | Trois (1876), Mizzan (1994) | Preserved taxidermied in Venice Museum of Natural History "Fonтего dei Turchi" (Cat. No. 7781); in Mizzan (1994) a different length is given. |
| Before 1879 | Nice (France) | M | 258 | - | F. Barbagli (<i>pers. comm.</i>) | Preserved taxidermied in Pavia Museum of Zoology (Cat. No. 854 Coll. Pesci). |
| 26 June 1887 | Genoa (Italy) | F | - | - | Vanni (1992) | Cranium preserved in Florence Museum of Zoology "La Specola" (Cat. No. 6355). |
| 1898 | Nice (France) | M | 150 | - | Sarda & De Maddalena (2003) | Preserved taxidermied in Prague Museum of Natural History (Cat. No. NMP6V 05253). |
| February 1904 | Chioggia (Italy) | F | 113 | - | Ninni (1904), Mizzan (1994) | Preserved taxidermied in Venice Museum of Natural History "Fonтего dei Turchi" (Cat. No. 7800). |
| Before 1909 | Bocchicella (Italy) | F | 180 | - | Lo Bianco (1909) | Immature. |
| Before 1923 | Italy (?) | - | - | - | Vinciguerra (1923) | Preserved taxidermied in Genoa University Museum of Zoology. |
| Before 1923 | Italy (?) | - | - | - | Vinciguerra (1923) | Once preserved taxidermied in Genoa University Museum of Zoology. |
| 22 May 1923 | Noli (Italy) | F | 240 (230) | 80 (guttled) | Vinciguerra (1923), Tortonese (1956) | Preserved taxidermied in Genoa Museum of Natural History "G. Doria"; in Tortonese (1956) a slightly different length is given. |
| Before 1934 | Palermo (Sicily, Italy) | F | 193 | - | Borri (1934) | Preserved taxidermied in Calci Museum of Natural History and the Territory. |
| 22 July 1937 | Messina Strait (Italy) | F | - | ca. 60 | Cipria (1937) | Gravid. Litter size unknown. |
| July 1949 | Golfe d'Aigues-Mortes (France) | - | - | - | Granier (1964) | - |
| 1951 | Camogli (Italy) | - | - | 17.5 | Boero & Carli (1979) | - |
| 1953 | Camogli (Italy) | - | - | 13 | Boero & Carli (1979) | - |
| Around 1980 | Alboran Sea | - | - | - | Barrull & Mate (2002) | - |
| April-May, around 1985 | Capo Bianco, Elba Island (Italy) | F | ca. 250 | ca. 200 | G. Chiocca (<i>pers. comm.</i>) | Gravid. Litter size at least 13. |
| 2 April 2000 | Annaba (Algeria) | F | 254 | 99 (guttled) | Hemida & Capapé (2002) | - |
| - | Nice (France) | - | - | - | P. Deynal (<i>pers. comm.</i>) | Preserved taxidermied in Paris National Museum of Natural History (Cat. No. MNHN 0520). |

A total of 11 *E. brucus* specimens are preserved in 9 European Natural History Museums located in Italy, Czech Republic and France. Preserved materials include 10 taxidermied specimens and one cranium. The female *E. brucus* caught in 1856 off Nice, France, and measuring 296 cm, is close to the maximum size reported in the literature for this species (about 310 cm according to Compagno, 1984). Unfortunately, the Museum of Natural History was destroyed during bombing raids on Milan during Second World War, between 13 and 15 August 1943 (Conci, 1980), and numerous specimens, including the large bramble shark, were lost. Therefore, to the best of our knowledge, a 258 cm long male caught before 1879 off Nice, France, on display in Pavia Museum of Zoology (Cat. No. 854 Coll. Pesci; F. Barbagli, *pers. comm.*), is the largest of any Mediterranean bramble shark presently preserved.

Bramble sharks have always been rare in the Mediterranean Sea. Most bramble shark specimens have been reported from Italian waters. Nevertheless, to the best of our knowledge, no specimens have been recorded in Italian waters since 1985. The alarming paucity of recent Mediterranean records of *E. brucus*, examined in a historical context, in fact infers that the species is very rare in these waters and, as Hemida & Capapé (2002) already noted, these sharks have almost disappeared from the entire region. In fact, among the species that have become particularly sporadic or rare due to overfishing of either sharks or their prey in the Mediterranean Sea, Cugini & De Maddalena (2003) cited the bramble shark, *E. brucus*, sandtiger shark, *Carcharias taurus*, smalltooth sand tiger, *Odontaspis ferox*, white shark, *Carcharodon carcharias*, shortfin mako, *Isurus oxyrinchus*, porbeagle, *Lamna nasus*, tope shark,

Galeorhinus galeus, sandbar shark, *Carcharhinus plumbeus*, blue shark, *Prionace glauca*, smooth hammerhead, *Sphyrna zygaena* and angular roughshark, *Oxynotus centrina*. The bramble shark has to be classified as a critically endangered species. Lack of management in the Mediterranean countries is leading to the extinction of several shark species. *E. brucus* needs immediate protection in the entire Mediterranean area.

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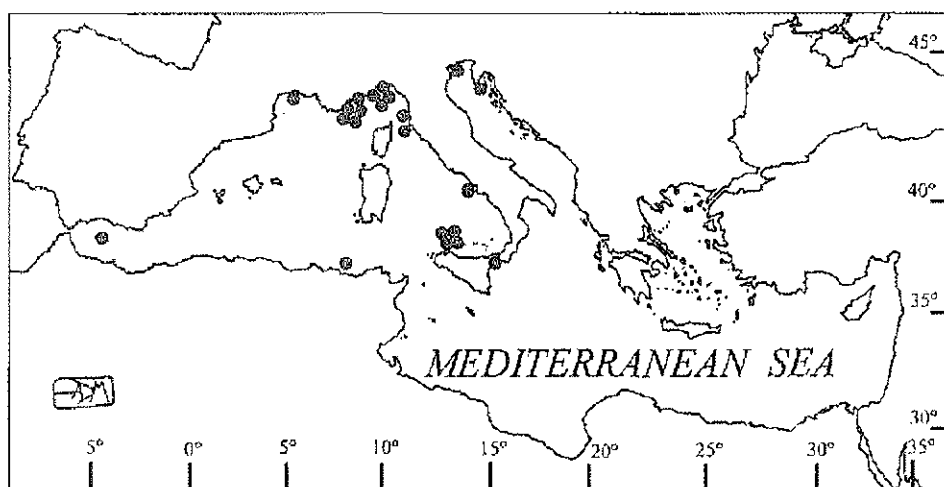


Fig. 3: Distribution of historical and recent bramble shark *Echinorhinus brucus* captures in the Mediterranean Sea. (Drawing: A. De Maddalena)

Sl. 3: Zgodovinski in novejši podatki o bodičastih morskih psih *Echinorhinus brucus*, ujetih v Sredozemskem morju. (Risba: A. De Maddalena)

BREJA SAMICA BODIČASTEGA MORSKEGA PSA, *ECHINORHINUS BRUCUS* (BONNATERRE, 1788), UJETA V BLIŽINE ELBE (ITALIJA, TIRENSKO MORJE)

Alessandro DE MADDALENA

Banca Dati Italiana Squalo Bianco, I-20145 Milano, via L. Ariosto 4

E-mail: ademaddalena@tiscalinet.it

Marco ZUFFA

Museo Archeologico "Luigi Donini", I-40064 Ozzano dell'Emilia, via Prunaro 1

POVZETEK

Okrog leta 1985 je bila v bližini Rta Bianco na Elbi (Italija, zahodno Sredozemsko morje) ujeta kakih 150 cm dolga samica bodičastega morskega psa *Echinorhinus brucus* (Bonnaterre, 1788). Njena notranjost je razkrila 13 jajc s premerom 8-10 cm. Avtorja predstavljata seznam 24 primerkov *E. brucus* iz Sredozemskega morja, skupaj z zgodovinskimi in novejšimi zapisi o teh redkih morskih psih. Večina osebkov (45,8%) je bila zabeležena v Ligurskem in severnem Tirenskem morju in avtorja domnevata, da bi se ta vrsta v tem območju utegnila tudi razmnoževati.

Razmerje med spoloma je bilo 1:3,3 v korist samcev. V devetih evropskih naravoslovnih muzejih je ohranjenih 11 bodičastih morskih psov. 296 cm dolga samica, ujeta v bližini Nice, Francija, je najbrž največja predstavnica te vrste, medtem ko je 258 cm dolgi samec, razstavljen v Zoološkem muzeju v Pavii, največji od vseh ohranjenih sredozemskih primerkov. Bodičasti morski pes je zelo redek v Sredozemskem morju, to pa je razlog, da ga je treba pri priči zaščititi v celotnem območju.

Ključne besede: bodičasti morski pes, *Echinorhinus brucus*, razmnoževanje, razširjenost, Sredozemsko morje

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