

## SCHEDA

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**TITOLO:** OSSERVAZIONI PRELIMINARI SUL TIPO DI DISCRIMINAZIONE E DI APPROCCIO DI SQUALO BIANCO (*Carcharodon carcharias*), DURANTE LE ATTIVITA' DI PREDAZIONE DI SUPERFICIE  
- *PRELIMINARY OBSERVATIONS ABOUT WHITE SHARK'S (Carcharodon carcharias) DISCRIMINATORY PATTERNS DURING SURFACE PREDATORY ACTIVITY AND TYPE OF APPROACH*

**Digitare una X nelle caselle di interesse:**

### 46° SIBM (SOLO POSTER)

- Tema: "La pianificazione spaziale marittima: ruolo del biologo marino"
- Comitato Acquacoltura  
 Comitato Benthos  
 Comitato Fascia Costiera  
 Comitato Necton  
 Comitato Plancton  
x  Sessione vari

### WORKSHOP CETACEI

- POSTER  
 COMUNICAZIONE

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*Si ricorda a tutti gli Autori che la partecipazione al congresso è vincolata al pagamento della quota di iscrizione dei singoli partecipanti*

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## PRELIMINARY OBSERVATIONS ON GREAT WHITE SHARK (*CARCHARODON CARCHARIAS*) SURFACE PREDATORY ACTIVITY

### OSSERVAZIONI PRELIMINARI SULLE ATTIVITÀ DI PREDAZIONE DI SUPERFICIE DI SQUALO BIANCO (*CARCHARODON CARCHARIAS*)

**Abstract** - The aim of the present study was to gather information on the behaviour of great white shark *Carcharodon carcharias* during surface predatory activities. According to the present results, vision plays an important role in feeding patterns and appears correlated to weather conditions.

**Key-words:** *Carcharodon carcharias*, predatory behaviour, elasmobranch, South Africa.

**Introduction** - Great white shark *Carcharodon carcharias* is distributed in temperate and tropical waters (Compagno *et al.*, 2005). Since 2003, a multidisciplinary team managed by the Centro Studi Squali (Massa Marittima, Italy) under the scientific coordination of the Universities of Calabria, Siena, and Bologna is developing research projects concerning different aspects of great white shark biology and conservation, with particular attention to social and predatory behaviour, ecotoxicology, parasitology and genetics (Micarelli *et al.*, 2006; Sperone *et al.*, 2010, 2012). Only few studies were addressed at describing mechanisms underlying patterns of prey selection and approach in great white shark (Tricas 1985; Myrberg & Nelson 1991; Strong 1996). In the attempt to gather new information on those aspects, the aim of the research was threefold: 1) to understand whether great white shark make choice based upon the shape or smell in front of a still floating seal-shaped decoy and a bloody piece of tuna fish, 2) to identify and describe the approach patterns to bait or decoy, 3) to correlate the observed patterns to sex and size of the sharks and to weather conditions.

**Materials and methods** - During three scientific expeditions carried out from 2008 to 2010, experimental observations on the surface predatory behaviour of great white shark have been gathered at Dyer Island Nature Reserve (South Africa) using a 12 m boat and a floating cage. The decoy used for the surveys was designed around a double layer of floating plastic and blown with polyurethane foam in order to get a three-dimensional ellipsoid-shape, and coloured using non-toxic paints. The dimensions were as close as possible to those of a juvenile sea lion (*Arctocephalus pusillus pusillus*): 70 cm long, 32 cm wide, with a diameter of about 60 cm. Seal shaped decoys and tuna piece floating baits were the tested targets. The data recorded included also specific biological information like: sex, total length, sexual maturity stage, distinguishing marks of identification, re-sightings, and number of approaches to the decoy. Approaches to the targets were classified as horizontal (0-30° between the body of the shark and the surface of the water), diagonal (31-60°) and vertical (61-90°); the starting

time of the event and its duration were also recorded. Shark total length (TL) was estimated to the nearest 0.5m based on the observations of the sharks next to the 5.0m observation vessel or a decoy in close proximity to the observation vessel. According to Compagno *et al.* (2005), males with TL>3.5m and females with TL>4.5m were considered mature. Weather conditions were recorded and classified as clouded sky, semi-clouded sky or unclouded sky using the Oktas classification. The correlations between shark approach and the biological and environmental variables were investigated.

**Results and conclusions** – A total of 104 great white shark specimens have been identified and monitored. On average, 4.82 approaches per specimen have been performed, and recorded by the scientific staff, mainly directed to bait than to decoy. However, the first approach was mainly targeting the seal shaped decoy than the bait (Chi-Square test  $\chi^2=5.378$ : d.f.=1: P<0.05). We did not find any significant correlation between the type of the target and shark sex and size. Although mature sharks mainly perform vertical approaches, and immature sharks prefer horizontal approaches, as previously observed by Andreotti *et al.* (2008), our data do not show any significant correlation between type of approach and type of the target, and shark length. In contrast, there was a strong correlation between the type of approach and the weather conditions: a transition from horizontally oriented to vertically oriented approach was observed with increasing cloud coverage ( $\chi^2=31.779$ : d.f.=4: P<0.05). Vision seems to play an important role in commonly used feeding patterns and appears correlated to weather conditions. Our observations suggest that these patterns appear to be adapted for exploiting a challenging suite of surface-dwelling prey species and may be the basis of a speculative hunting strategy wherein individuals sacrifice much of the possibility of identifying a potential prey item in exchange for an increased chance of capture. Further investigations are needed to understand predatory responses by great white shark.

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