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CAPTURE OF A RARE ENDANGERED SPECIES LEAFSCALE GULPER SHARK *CENTROPHORUS SQUAMOSUS* (CHONDRICHTHYES: SQUALIDAE) FROM THE COAST OF SENEGAL (EASTERN TROPICAL ATLANTIC)

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ABSTRACT

*This note presents a recent record of a specimen of rare shark leafscale gulper shark *Centrophorus squamosus*. A description of the specimen is given, including morphometric measurements, total body weight and dental formulae. Comments on this unusual and rare capture off the Senegalese coast are also provided.*

Keywords: Squalidae, distribution, conditions of capture, dental formula, coast of Senegal

CATTURA DI UNA SPECIE RARA E MINACCIATA, IL CENTROFORO SQUAME A FOGLIA *CENTROPHORUS SQUAMOSUS* (CHONDRICHTHYES: SQUALIDAE), AL LARGO DELLA COSTA DEL SENEGAL (ATLANTICO TROPICALE ORIENTALE)

SINTESI

*Questa nota tratta una cattura recente di un esemplare di una rara specie di squali, il centroforo squame a foglia, *Centrophorus squamosus*. Viene fornita una descrizione dell'esemplare, comprese le misurazioni morfometriche, il peso corporeo totale e le formule dentali. Gli autori inoltre discutono questa insolita e rara cattura al largo della costa senegalese.*

Parole chiave: Squalidae, distribuzione, condizioni di cattura, formula dentale, costa senegalese

INTRODUCTION

The leafscale gulper shark *Centrophorus squamosus* (Bonnaterre, 1788) is widely distributed on both sides of the Indian Ocean and off the western Pacific coast (White, 2003). The species is known along the eastern Atlantic shore from Iceland and the Atlantic Slope to the Canary Islands, Senegal, the Faeroes, Madeira and the Azores (White, 2003). Southward, *C. squamosus* occurs from Senegal, Gulf of Guinea to the west coast of South Africa (McEachran & Branstetter, 1984).

Previously, a total of 37 specimens *Centrophorus squamosus* had been examined, among them two large pregnant females carrying near term embryos (Cadenat & Blache, 1981). Since then, no specimen had been recorded although investigations were continuously and regularly conducted in the area (Capapé *et al.*, 1994,

2001; Diatta *et al.*, 2009; Diatta, 2014). Such lack of captures suggested that the species probably no longer occurred or, at least, had disappeared from the coast of Senegal. Conversely, in the wake of collaboration with experienced local fishermen, we were informed that a specimen of *Centrophorus squamosus* had been captured and delivered to our laboratory for a thorough examination. This new record forms the subject of the present paper, which includes a description of the specimen and some comments about the rare occurrence of this species in Senegalese waters.

MATERIAL AND METHODS

On 19 February 2015, a specimen of *Centrophorus squamosus* was caught by means of gill nets on rocky bottoms at a depth of 150–250 m, off the fishing site of Ouakam, located 5 km north of Dakar, in the Cape Verde Peninsula (17°36'04.20" W and 14°40'39.31" N) (Fig. 1).

The specimen was measured to the nearest millimetre and weighed to the nearest gram. Morphological measurements and teeth counts on upper and lower jaws were carried out following Compagno (1984) and are summarized in Table 1. The specimen was fixed in buffered formaldehyde and deposited in the Ichthyological Collection of the Institute Cheikh Anta Diop of Dakar (Senegal), under catalogue number IFAN Centr-squa 01.

RESULTS AND DISCUSSION

The studied specimen was a female, measuring 1300 mm in total length and weighing 11,200 g in total body weight (TWB). It was identified as a *Centrophorus squamosus* based on a combination of main morphological characters, such as: snout slightly long, broadly parabolic; no anal fin; both dorsal fins with large spines; first dorsal lower than the second dorsal, the latter moderately large, as high as or higher than first dorsal fin; free rear tips of pectoral fins, margins slightly extended (Fig. 2A); upper teeth erect at the centre third, but not symmetrical; lower teeth with serrated edges (Fig. 2B); denticles on the sides of the body closely-set and overlapping, leaf-like, with a high median ridge and a small lateral ridge on each side (Fig. 2C); colour uniformly dark grey.

The general morphology, the shapes of teeth and denticles, the morphometric measurements and the dental formula are in total agreement with Bass *et al.* (1976), Cadenat & Blache (1981), Compagno (1984) and McEachran & Branstetter (1984), confirming the identification of this shark, which constitutes the latest known record of *C. squamosus* from the coast of Senegal.

Species of the genus *Centrophorus* Müller & Henle, 1817 are generally targeted by fishermen, especially for the extraction of liver oil, which is highly appreciated in cosmetology and pharmacology (Diatta, 2014). Nowadays, only specimens of gulper shark *C. granulosus* (Bloch & Schneider, 1801) are commonly captured

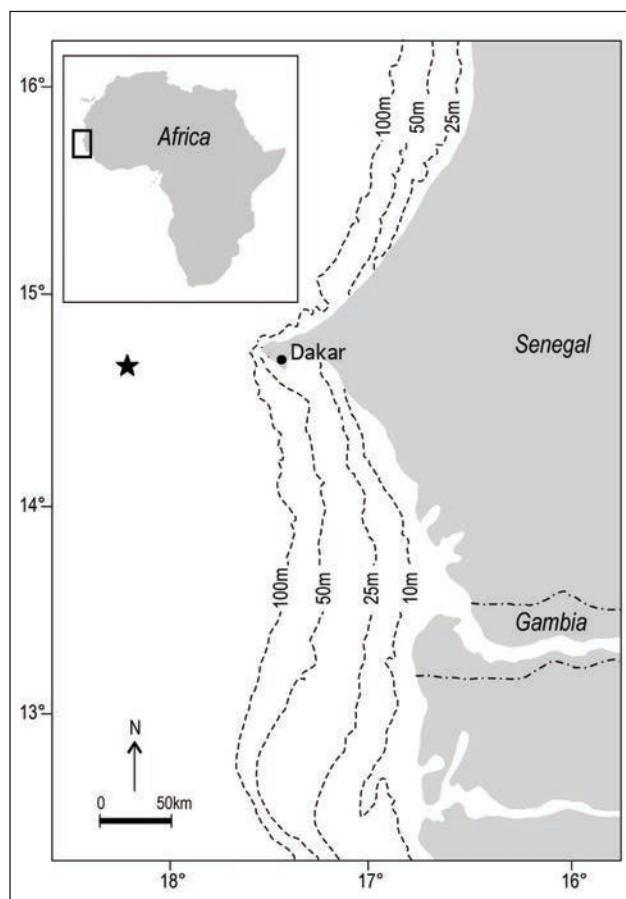


Fig. 1: Map of the coast of Senegal indicating (black star) the capture site of the specimen of *Centrophorus squamosus* (ref. IFAN Centr-squa 01), redrawn from Diatta *et al.* (2013).

Sl. 1: Zemljevid senegalske obale z označbo lokalitete, kjer je bil primerek (ref. IFAN Centr-squa 01) vrste *Centrophorus squamosus* ujet. Prirejeno po Diatta s sod. (2013).

Tab 1: Morphometric measurements (in mm and as % TL), total body weight (in gram) and dental formulae recorded in the specimen of *Centrophorus squamosus* (ref. IFAN Centr-squa 01).

Tab. 1: Morfometrične meritve (v mm in kot % dolžine telesa), celotna telesna teža (v gramih) in zobna formula primerka vrste *Centrophorus squamosus* (ref. IFAN Centr-squa 01).

Reference	IFAN Centr-squa 01	
Sex	Female	
Total body weight (g)	11200	
Measurements	mm	% TL
Total length	1300	100.0
Fork length	1140	87.7
Precaudal length	1030	79.2
Pre-first dorsal length	43	3.3
Pre-second dorsal length	830	63.8
Head length	290	22.3
Prebranchial length	220	16.9
Prespiracular length	150	11.5
Preorbital length	60	4.6
Prepectoral length	253	19.5
Prepelvic length	780	60.0
Snout-vent length	880	67.7
Interdorsal space	310	23.8
Dorsal caudal space	81	6.2
Pectoral-pelvic space	500	38.5
Pelvic-caudal space	700	53.8
Vent-caudal length	460	35.4
Eye length	50	3.8
Eye height	30	2.3
Prenarial length	45	3.5
Intergill length	60	4.6
First gill slit height	35	2.7
Fifth gill slit height	42	3.2
Pectoral anterior margin	141	10.8
Pectoral inner margin	88	6.8
Pectoral posterior margin	103	7.9
Pectoral height	152	11.7
Dorsal caudal margin	210	16.2
Terminal caudal lobe	122	9.4
Subterminal caudal margin	27	2.1
Preventral caudal margin	168	12.9
First dorsal anterior margin	190	14.6
First dorsal height	80	6.2
First dorsal posterior margin	135	10.4
First dorsal base	205	15.8
First dorsal length	280	21.5
First dorsal inner margin	90	6.9
Second dorsal anterior margin	130	10.0
Second dorsal height	42	3.2
Second dorsal posterior margin	103	7.9
Second dorsal inner margin	35	2.7
Second dorsal base	125	9.6
Head height	180	13.8
Trunk height	210	16.2
Abdomen height	190	14.6
Tail height	110	8.5
Caudal peduncle height	55	4.2
Pelvic midpoint-second dorsal insertion	230	17.7
First dorsal midpoint- pelvic origin	270	20.8
Second dorsal insertion- pelvic insertion	140	10.8
Pelvic posterior margin length	80	6.2
Pelvic inner margin length	65	5.0
Pelvic base	87	6.7
Pelvic length	145	11.2
Pelvic anterior margin	130	10.0
Pelvic height	103	7.9
Interorbital space	102	7.8
Head width	240	18.5
Trunk width	300	23.1
Abdomen width	350	26.9
Caudal peduncle width	30	2.3
Mouth length	50	3.8
Mouth width	190	14.6
Internarial space	40	3.1
Dental formulae	16-1-16/13-1-13	



Fig. 2: A. General morphology of the specimen of *Centrophorus squamosus* (ref. IFAN Centr-squa 01) caught off the coast of Senegal, scale bar = 200 mm. B. Jaw of the same specimen showing upper and lower teeth, scale bar = 100 mm. C. Denticles removed from the dorsal surface of the same specimen, scale bar = 2 mm.

Sl. 2: A. Morfologija primerka vrste *Centrophorus squamosus* (ref. IFAN Centr-squa 01), ujetega ob obali Senegala, merilo = 200 mm. B. Čeljust z zgornjimi in spodnjimi zobmi, merilo = 100 mm. C. Dentikli s hrbtne površine raziskanega primerka, merilo = 2 mm.

throughout the Senegalese coast (Diatta *et al.*, 2009). Some morphological differences allow distinguishing *C. squamosus* from *C. granulosus*. *C. squamosus* displays free rear tips of the pectoral fins, broadly angular and not reaching past the first dorsal spine, denticles in adults exhibit multiple lateral cusps. In *C. granulosus*, the free rear tips of the pectoral fins extend into narrow angular lobes, which reach past the first dorsal fin origin, and denticles in adults are without cusps, broadly rounded posteriorly. Since local fishermen are familiar with captures of *C. granulosus* in the area, they were able to distinguish this species from *C. squamosus*, and therefore they could immediately bring it to the laboratory for a thorough examination. The rarity of the species in the area could also explain why these fishermen could express a positive, or at least neutral, attitude to this shark species. The specimen was captured over continental shelf grounds at a depth of 150 to 200 m, which is normally shallower than the depth ranges

reported by McEachran & Branstetter (1984). According to McEachran & Branstetter (1984), *C. squamosus* is a benthic species inhabiting deeper areas, from 400 to 1875 m, rarely below 1000 m. Although these areas are poorly exploited by fishermen, this does not fully explain the scarcity of the species in commercial catches. However, this isolated capture of a single specimen suggests that the species is not completely extinct in the area, but other records are needed to state if a viable population still occurs in the area or if the species is dangerously threatened.

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ULOV REDKEGA IN OGROŽENEGA MORSKEGA PSA *CENTROPHORUS SQUAMOSUS*
(CHONDRICHTHYES: SQUALIDAE) IZ OBALNIH VODA SENEGALA
(VZHODNI TROPSKI ATLANTIK)

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POVZETEK

*Avtorji poročajo o ulovu primerka redkega morskega psa vrste *Centrophorus squamosus*. Navajajo opis vrste, morfometrične meritve, telesno težo in zobno formulo. Poleg tega razpravljajo o tem redkem in nenavadnem ulovu ob obali Senegala.*

Ključne besede: Squalidae, razširjenost, podatki o ulovu, zobna formula, senegalska obala

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