

SHORT COMMUNICATION

Occurrence of a rare shark, *Oxynotus centrina* (Chondrichthyes: Oxynotidae), from Saros Bay, North Aegean Sea, Turkey

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Abstract

A specimen of angular rough shark, *Oxynotus centrina* was captured on 22 September 2008, in Saros Bay, the North Aegean Sea, Turkey, by a commercial bottom trawl at a depth of 65.5-74.6 m. The captured specimen was a female with a total length of 651 mm and a weight of 4652 g. The ovaries contained a total of 12 asymmetrically distributed (7 and 5 in the right and left ovary, respectively) developing oocytes ranging from 25 to 30 mm in diameter.

Keywords: angular rough shark, morphometric measurements, Saros Bay

The angular rough shark, *Oxynotus centrina* (Linnaeus, 1758), is a poorly known species of the family Oxynotidae. *O. centrina* is distributed along the entire Mediterranean Sea and in the eastern Atlantic from the British Isles to South Africa, inhabiting muddy bottoms in the continental shelves and upper slopes at depths of 50-660 m but typically occurring below 100 m (Compagno 1984). *O. centrina* is a medium sized (up to 150 cm) species with a high body that is triangular in cross section. Due to the rare occurrence of this species there is very limited information on its biology and distribution (Kousteni and Megalofonou 2010). In addition, *O. centrina* is currently assessed as “vulnerable” globally and listed in the IUCN Red List (Gibson *et al.* 2008).

Earlier records of the angular rough shark reported its presence in the Italian coast (Tortonese 1956), Gulf of Lions, France and the Tunisian coast (Capapé *et al.* 1999), the Eastern Adriatic Sea (Dragičević *et al.* 2009), the North Aegean Sea, Thermaikos Gulf, Pagassitikos Gulf, Saronikos Gulf and Patraikos Gulf (Papakonstantinou 1988) and in the Korinthiakos Gulf (Nicolaidou *et al.* 2012), the Central Aegean Sea near the island of Kea (Megalofonou and Damalas 2004) and in the South Eastern Aegean Sea, in the Dodecanese waters (Corsini-

Foka 2009). The existence of this species was also reported in several studies from the Turkish waters (Erazi 1942; Başusta *et al.* 1998; Bayhan *et al.* 2006; Eryılmaz 2003; Kabasakal 2003, Kabasakal and Kabasakal 2004; Öziç and Yılmaz 2006; Kabasakal 2009; Başusta *et al.* 2015). Recently, Ismen *et al.* (2009) reported 4 specimens from Saros Bay with no further information on their biology. The present study reports additional occurrence of *O. centrina* from Saros Bay, the North Aegean Sea, with information on its reproduction biology.

A female angular rough shark was caught by a commercial trawl on 22 September 2008, at a depth of between 65.5-74.6 m in Saros Bay (Figure 1). Morphometric measurements were carried out following Compagno (1984), and recorded to the nearest 0.01 mm using digital calipers (Figure 2). Total weight and gonad weight were recorded to the nearest gram. Eggs were counted in each ovary and measured.

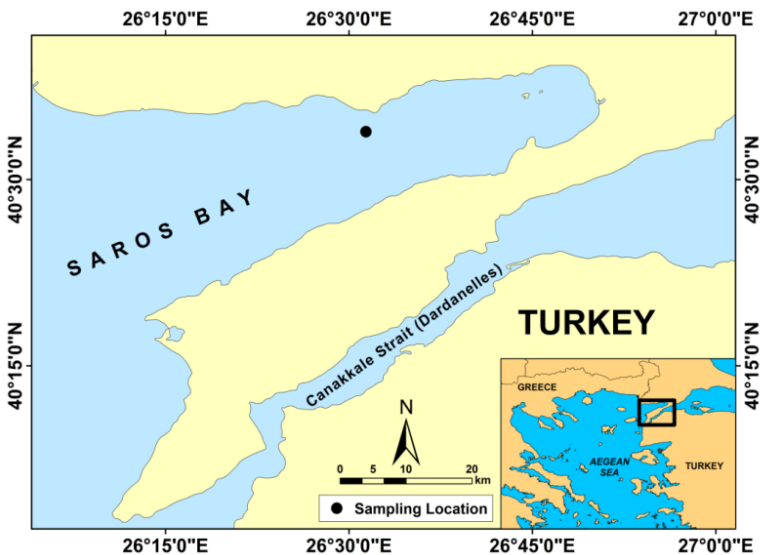


Figure 1. Sampling location of the angular rough shark specimen in Saros Bay

Table 1 presents morphometric measurements of *O. centrina* reported by others in the Mediterranean and those measured in this study. The total length of the present specimen was 651 mm and its weight was 4652 g. The size of specimen in this study is within the range reported for those caught in the Aegean Sea and is very close to the average size of females reported in other regions. For example, Kousteni and Megalofonou (2010) recorded the total length of three specimens from the Greek Seas as 533, 565 and 790 mm. Dragičević *et al.* (2009) recorded a female of 800 mm in total length from the Adriatic Sea. A

female with a total length of 65 cm was reported from the Northeastern Aegean Sea (Kabasakal and Kabasakal 2004).

The present specimen contained a total of 12 developing eggs. This finding is in agreement with those of others who reported that the angular rough sharks produce 10 to 12 embryos once a year (Capapé *et al.* 1999; Nicolaidou *et al.* 2012; Baştusta *et al.* 2015). The developing eggs were asymmetrically distributed in the ovaries; 7 in the right ovary and 5 in the left ovary. This is also in agreement with Capapé *et al.* (1999) and Dragičević *et al.* (2009), who reported asymmetrically distributed oocytes in ovaries. Left and right ovaries weighted 77.29 g and 113.10 g, respectively. The mean weight (\pm standard deviation) of the oocytes was 15.85 ± 1.91 g which was similar to 14.70 g reported by Dragičević *et al.* (2009) but was lighter than 24.45 g reported by Capapé *et al.* (1999). The diameters of the oocytes of the present specimen ranged between 25-30 mm (mean 27.7 ± 1.5), while those reported by Capapé *et al.* (1999) and Dragičević *et al.* (2009) ranged between 38-41 mm and 24-35 mm, respectively. Our findings suggest that the oocytes of the current specimen were still in developing stage.



Figure 2. Angular rough shark, *Oxyrinus centrina*, caught from Saros Bay in 2008 (Photo: Ali İSMEN and C.Çigdem YIĞIN).

The angular rough shark does not have an economical value. It is a by-catch species and generally discarded at sea by commercial fishermen. Incidental findings are important for uncommon species as they provide critical information on their distribution, habitat and biology. This is the case for *O. centrina* with very limited biological and distributional information due to its rare occurrence and lack of detailed studies. *O. centrina* is considered a deep water species (Compagno 1984; Dragičević *et al.* 2009) and the development of deep-sea fisheries will be a potential threat for this species. Saros Bay has been declared as a specially protected area by the Ministry of Environment and Forestry of Turkey in 2010, thus all types of commercial fishing activities are prohibited in the area. The majority of *O. centrina* species reported from

Turkey, however, are from the Sea of Marmara (Kabasakal 2010), which is open to commercial fisheries. In addition, similar to the findings of Kabasakal (2010) and Dragičević *et al.* (2009), our study has shown that capture of the angular rough shark in relatively shallower waters is possible. Such occurrences in shallower waters may possess a further threat for this threatened species in the Mediterranean as it indicates that the angular rough shark is vulnerable to shallow water fishing activities.

Table 1. Morphometric measurements of *O. centrina* caught in Saros Bay (this study) and other areas.

Morphometric characteristics (mm, g)	This study	Megalofonou and Damalas (2004)	Dragičević <i>et al.</i> (2009)	Kousteni and Megalofonou (2010)		
	Saros Bay, the North Aegean Sea	Eastern Mediterranean Sea	Adriatic Sea	Specimen 1 NE Aegean Sea	Specimen2 NE Aegean Sea	Specimen3 Korinthiakas Gulf
TL (total length)	651	690	800	533	565	790
TW (total weight)	4652	4000	7883	1649	1703	5020
FL (fork length)	620	640	760	-	-	-
HDL (head length)	118	104	120	105	111	131
IDS (interdorsal space)	133	146	145	87	112	141
PRC (precaudal length)	522	560	630	-	-	-
PD1 (prefirst dorsal fin length)	155	165	173	118	122	142
PD2 (presecond dorsal fin length)	422	425	480	302	353	421
PP1 (prepectoral fin length)	120	103	125	91	102	128
P1A (pectoral fin anterior margin)	112	132	130	-	-	-
D1A (first dorsal anterior margin)	123	133	165	-	-	-
D1H (first dorsal height)	80	94	103	76	78	83
D1B (first dorsal base)	82	86	145	95	102	138
D2A (second dorsal anterior margin)	98	104	125	-	-	-
D2H (seconddorsalheight)	66	112	82	44	64	66
D2P (seconddorsalposteriormargin)	56	69	95	-	-	-
D2B (second dorsal base)	65	63	95	62	79	86
P2A (pelvic anterior margin)	54	69	77	-	-	-
P2H (pelvic height)	45	63	61	-	-	-
P2P (pelvic posterior margin length)	62	73	101	-	-	-
P2B (pelvic base)	52	50	65	-	-	-
CDM (dorsal caudal margin)	122	119	140	-	-	-
CTR (terminal caudal margin)	34	40	49	-	-	-
CPV (preventral caudal margin)	75	78	90	-	-	-
CPH (caudal peduncle height)	27	28	31	22	25	31
HDH (head height)	89	58	70	65	93	89
TRH (trunk height)	110	126	160	90	103	103
ABH (abdomen height)	122	100	140	92	122	146
EYL (eye length)	24	25	25	-	-	-

The establishment of Saros Bay marine protected area is an important step towards protecting and understanding marine life in the Northeast Aegean Sea. From the view point of marine conservation, biological information on the reproductive characteristics of vulnerable and threatened species are critical to protect and preserve these organisms and their habitats. However, although restricted fishing activities have positive effects on marine biodiversity in Saros Bay, continuous efforts are needed to document and characterize life history traits of uncommon and endangered species and to establish species-specific conservation plans. The occurrence of a gravid female indicates that Saros Bay is potentially a nursery area for this vulnerable species (Bradai *et al.* 2007) but further research is required to elucidate reproductive cycle of *O. centrina* in this region.

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