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## Range extension for crested oarfish *Lophotus lacepede* Giorna, 1809 in the waters of the northern Aegean Sea, Greece

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*On September 20<sup>th</sup> 2011, a rather large specimen of 134 cm total length (mature, female), weighing 6974 g, of the rare crested oarfish *Lophotus lacepede* Giorna 1809, was obtained from a fisherman fishing off Halkidiki Peninsula, north Aegean Sea (Greece). This capture represents the northernmost record in the Aegean Sea for one of the scarcest species in Eastern Mediterranean.*

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**Key words:** *Lophotus lacepede*; Crested oarfish, Aegean Sea

### INTRODUCTION

Fishes of the order Lampriformes are represented by 21 species in 12 genera and 7 families (NELSON, 2006). These fishes are some of the most colorful and morphologically diverse teleosts. The family Lophotidae consists of two genera, *Lophotus* and *Eumecichthys*; the first of which includes the species: *Lophotus lacepede* Giorna, 1809, which seems to be valid, while the other two *Lophotus capellei* Temminck and Schlegel, 1845, and *Lophotus guntheri* Johnson, 1883 are regarded as rather questionable (NELSON, 2006).

In the Mediterranean only the crested oarfish *L. lacepede* appears, reaching 180 cm, but usually 100 cm in length (PALMER, 1986; BAUCHOT, 1987). They have pelagic eggs and larval stages, and juveniles have been taken in the plankton tows, both at the surface and at depth (CHARTER & MOSER, 1996). The crested oarfish appears to be a rather rare marine species which inhabits the lower epipelagic zone, normally of low sampling

density, occurring however, in most oceans and is recorded both on the surface and at a depth of 300m (HEEMSTRA, 1986; PALMER, 1986; OLNEY, 1999). The species is probably circumglobal, but perhaps limited to the Atlantic basin, including Mediterranean Sea (ESCHMEYER, 2015).

Crested oarfish has sporadic appearances in the Mediterranean, while considered rare in the Aegean Sea reporting only from the Ionian and Adriatic Sea (TORTONESE, 1970; PALMER, 1986). The present first documented record indicates a significant range extension of their previously known distribution, contributing to the better knowledge to the Mediterranean fish fauna and its spreading and to Aegean Sea, as well.

### MATERIAL AND METHODS

On September 20<sup>th</sup> 2011, a 134 cm (total length) and 6974g total weight specimen of crested oarfish *L. lacepede* (Fig. 1) was collected from a commercial long liner using bottom long line (hook No 13 baited with sardine) in the outer

part of Thermaikos gulf on northern Aegean sea (39°37'40.20" N, 23°16'21.59" E) off the Cape Poseidi, Halkidiki Peninsula, Greece (Fig. 3). The target species was the European hake *Merluccius merluccius* (Linnaeus, 1758). The specimen of *L. lacepede* was captured from a depth of c.a. 300 m (maximum depth at the site) during daytime (between 12:00-16:00 hours). The single specimen obtained, before permanent fixing, was stored in a deep freezer and deposited in the collection of the Department of Aquaculture and Fisheries Technology, Alexander Technological Educational Institute of Thessaloniki, Greece (catalogue number: 2011-015). The specimen was identified as *L. lacepede* according to the diagnostic characteristics described by OLNEY (1999).

## RESULTS AND DISCUSSION

The specimen in view has an elongated, laterally compressed body; the dorsal fin is long-based and low, originating up to the snout in front of the eyes and extending over the entire body-till the caudal peduncle and contains 223 rays. Pectoral fins contain 15 rays. Ventral fins are very short having 5 rays and originate under the pectoral. The anal fin is relatively short with 18 rays and situated posteriorly, near the caudal fin, which is small, pointed with 17 rays. All fins are pinkish while the color of the body dorsally is light brown with white spots and ventrally silvery-white. There are very small and thin cycloid scales easily rubbed off. Total length (TL) was measured to 134 cm, head length (HL) to 14.5 cm, maximum body height (MBH) to 23.5 and total body weight (W) to 6974 g.

The mouth is small and protractile. The teeth are pointed and conical, set in three irregular rows in both jaws although more irregularly planted in the maxilla. There is a small patch of pointed teeth on the vomer inclined inwardly to the pharynx. Lateral line is present. In the body cavity there is an elongated gland, filled with thick black liquid like ink. It starts at the esophagus and extends to the anus. Regarding feeding, remains were found in the stomach belonging: (a) to at least three small individuals of bony



Fig. 1. Crested oarfish, *Lophotus lacepede* Giorna, 1809. A. specimen 134 cm TL captured off Halkidiki Peninsula (Northern Aegean Sea) and B. specimen 85 cm TL caught on the coast of Mochlos village, Sitia, the island of Crete (Southern Aegean Sea)

fishes (six eye balls were counted and remains of skeleton and flesh), and (b) to thirteen cephalopods (squids, Loliginidae or Ommastrephidae family) since twenty six mandibles were counted. This is in agreement with REY (1983), who found four cephalopods and two prawns in the stomach of a crested oarfish individual collected in Gibraltar. The crested oarfish seems to be fed on small pelagic fishes (sardines, anchovies) and squids (see also PALMER, 1986; BAUCHOT, 1987). As a meso-bathypelagic species, it is caught mainly by long line, especially while it is moving in the water column (mainly sinking). The rarity of its records may be a result of the above. The present specimen was a female in a fairly advanced stage of sexual maturity, and the ovaries were "Y" shaped and weighed (Wg) 472 g. Gonadosomatic Index (GSI) was estimated to 6.77. There were also found, five isopod parasites at the end of the opening of the gonads (at the anus), measuring between 0.6 and 1.5 cm. Swim bladder was not connected to the gut by a pneumatic duct.

Although PALMER (1986) did not report this species in the eastern Mediterranean, records of the crested oarfish in the Greek Seas exist since the 19th century (HELDREICH, 1878; APOSTOLIDIS, 1883) under the name of *Lophotus lacepedei*. However, due to the rarity of the species little is known about its distribution and biology within this region. The species seems to appear more frequently in the western Mediterranean (PALM-

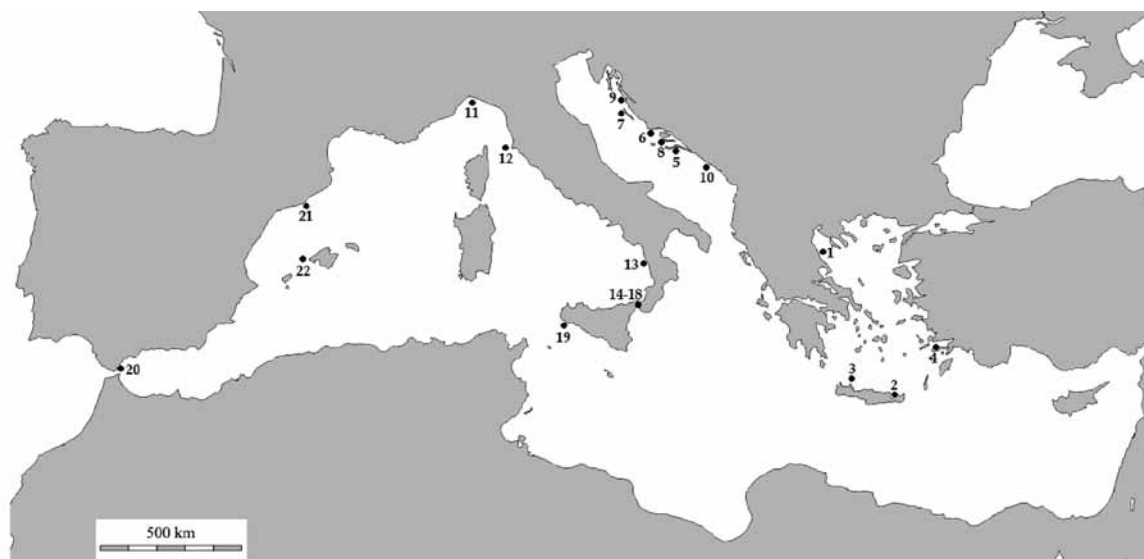


Fig. 2. Confirmed captures of crested oarfish, *Lophotus lacepede* in the Mediterranean Sea. Detailed information for each report is presented in Table 1

ER, 1986; BAUCHOT, 1987) (Fig. 2). This higher frequency may be due to the stronger sampling effort, or the vicinity of western Mediterranean basin with the Atlantic Ocean from where it enters. In the rest of the Mediterranean, reports exist since 1839 and 1890 from Sicily, Italy (SWAINSON, 1839) and S. Adriatic Sea, Croatia (KOLOMBATOVIĆ, 1890) respectively. In Greek waters, the older reports (see references according to ECONOMIDIS, 1973) do not specify the site of capture. Perhaps the species was recorded initially as a peculiar species by the HELDREICH (1878). This information was also repeated by APOSTOLIDIS (1883). The Mediterranean detailed reports (site and date of capture, individual length) of crested oarfish captures are seen in Table 1, and presented in the map in Figure 2.

However, another record, yet not published, from Greek waters is based on an 85 cm specimen (Fig. 1) caught in Southern Aegean Sea, on the coast of Mochlos village, Sitia (the island of Crete) ( $35^{\circ}11'01.88''$  N,  $25^{\circ}54'26.81''$  E) (Fig. 2) in January 1989. The fish was alive, swimming at the depth of 1.5 m near the coast and collected by hand. Another individual about 1m long was collected on summer of 2003 from a commercial long liner using bottom long line in southern Aegean Sea off the Souda bay, northern west coast in the island of Crete, Greece (Fig. 2)

where the target species was the Atlantic Bluefin tuna *Thunnus thynnus* (Linnaeus, 1758) (MAVROUDIS, personal communication).

It is likely that the scarcity of crested oarfish was due to the fact that Mediterranean bathypelagic zone was hardly exploited by fishing and/or sampling. Sporadic captures of the species show no regularity and they may be considered as a visitor trying to explore a new area. Crested oarfish seem to appear in southern and eastern Mediterranean during summer until September (RAGONESE *et al.*, 1997; BILECENOĞLU *et al.*, 2001; TRIPEPI *et al.*, 2004, present paper). In the western and northern parts of the Mediterranean, appears later in October (SULIĆ ŠPREM *et al.*, 2014), December (REY, 1983), January (GUIFFRE *et al.*, 1980; PORTAS & DEL CERRO, 1982; DULČIĆ & SOLDI, 2008) and February (MOROVIĆ, 1950; MAGAZZU & ZACCONE, 1971; DULČIĆ & AHNELT, 2007). The question if crested oarfish is in fact a permanent inhabitant of the area, with a well established population, or it occurs there occasionally, after passive migration of eggs or larvae, remains to be solved. However, the advanced maturity stages of the ovaries of the present sample indicate that probably the species is reproducing in the Aegean Sea. A sexual mature male individual was also reported from the Adriatic Sea too (DULČIĆ & SOLDI, 2008). Additionally, from

Table 1. *Mediterranean reports of Lophotus lacepede*

Report	Country	Site of capture	Date of capture	Length (cm)	Reference
1	Greece	Outer Thermaikos gulf, N. Aegean Sea	20 September 2011	134 (TL)	Present report
2	Greece	Sitia, Crete, S. Aegean Sea	January 1989	85 (TL)	Present report
3	Greece	Off Souda bay, Crete, S. Aegean Sea	July 2003	100 (TL)	Present report
4	Turkey	Gökova gulf, S.E. Aegean Sea	15 August 2000	30.2 (SL)	BILECENOĞLU <i>et al.</i> (2001)
5	Croatia	Trpanj, Pelješac peninsula, S. Adriatic Sea	7 June 1890	115 (TL)	KOLOMBATOVIĆ (1890)
6	Croatia	Trogir, E. Adriatic Sea	13 February 1926	100 (TL)	MOROVIĆ (1950)
7	Croatia	Zadar, E. Adriatic Sea	9 April 1901	72 (SL)	DULČIĆ & AHNELT (2007)
8	Croatia	Split, E. Adriatic Sea	2 February 1906	68.3(SL)	DULČIĆ & AHNELT (2007)
9	Croatia	Pag Island, E. Adriatic Sea	20 January 2006	167 (TL)	DULČIĆ & SOLDO (2008)
10	Croatia	Kupari, S. Adriatic Sea	October 2011	139 (TL)	SULIĆ ŠPREM <i>et al.</i> (2014)
11	Italy	Giorna, Genova, Tyrrhenian Sea	*	126 (TL)	TORTONESE (1970)
12	Italy	Ischia island, Gulf of Naples, Tyrrhenian Sea	*	*	BUSSOTTI <i>et al.</i> (1999)
13	Italy	Calabria, S. Tyrrhenian Sea	August 2002	190 (TL)	TRIPEPI <i>et al.</i> (2004)
14	Italy	Messina straights, Sicily	16 January 1980	140 (FL)	GUIFFRÉ <i>et al.</i> (1980)
15	Italy	Messina straights, Sicily	*	11 (TL)	TORTONESE (1970)
16	Italy	Messina straights, Sicily	June	0.7 (TL) Larvae	SANZO (1940)
17	Italy	Messina straights, Sicily	December	2.1 (TL) Juvenile	SPARTÀ (1954)
18	Italy	Messina straights, Sicily	11 February 1968	138 (TL)	MAGAZZU & ZACCONE (1971)
19	Italy	Mazara del Vallo, S.W. Sicily	18 June 1995	147 (TL)	RAGONESE <i>et al.</i> (1997)
20	Spain	Gibraltar	14 December 1980	66.2 (SL)	REY (1983)
21	Spain	Sitges, Garraf, Catalonia	20 January 1981	147.5 (TL)	PORTAS & DEL CERRO (1982)
22	Spain	Balearic region	July 2005	Larvae	RODRIGUEZ <i>et al.</i> (2013)

\* No information available or provided by the author.

the first half of the 20<sup>th</sup> century there are reports for successive reproduction of this species in the Mediterranean during summer from SANZO (1940) and SPARTÀ (1954), who illustrated eggs, larvae and juveniles of crested oarfish from the Strait of Messina, until today (RODRIGUEZ *et al.*, 2013) who collected larvae in July in the Balearic region. Finally, TORTONESE (1970) reported that he collected two young specimens in Messina about 11 cm long.

All the above analysis is leading to the conclusion that crested oarfish is so far a solid element of the marine fish fauna of the Mediterranean. The scarce information obtained, due to the past low sampling density in the East part of the Mediterranean create a rather false image of the species spreading eastwards. Furthermore, the gradual subtropicalisation of the Mediterranean contributes to the homogenisation of fish

fauna, from south to north. So, the appearance of this species in the north part (Adriatic, North Aegean seas) and other, even more thermophile species (*Fistularia commersonii*, *Lobotes surinamensis*, *Terapon theraps*) does not seem to be a paradox anymore. The above scenario also supports the stability of the ecosystems because it increases the biodiversity of the area.

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## Širenje područja rasprostranjenja britke jedroglavke, *Lophotus lacepede* Giorna 1809 u vodama sjevernog Egejskog mora, Grčka

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### SAŽETAK

Dana 20. rujna 2011. godine, prilično velika jedinka 134 cm ukupne dužine (zrela ženka), mase 6974 g, rijetke vrste britka jedroglavka *Lophotus lacepede* Giorna 1809, je ulovljena pokraj poluotoka Halkidiki, sjeverno Egejsko more (Grčka). Ovaj ulov predstavlja najsjeverniji nalaz u Egejskom moru jedne od najrjeđih vrsta u istočnom Mediteranu.

**Key words:** *Lophotus lacepede*, britka jedroglavka, Egejsko more

