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NEW RECORDS OF THE LESSEPSIAN MIGRANT, BLUESPOTTED  
CORNETFISH, *FISTULARIA COMMERSONII* (OSTEICHTHYES:  
FISTULARIDAE) OFF THE TUNISIAN COAST (CENTRAL MEDITERRANEAN)

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ABSTRACT

*Fourteen specimens of the bluespotted cornetfish *Fistularia commersonii* were recorded in Tunisian marine waters suggesting that the species should be at present considered as successfully established in the area. All specimens were caught off Ras Jebel, these captures constituting the northernmost extension range of the species off the Tunisian coast. *F. commersonii* is a highly carnivorous species and its negative role in the biological environment cannot be neglected.*

**Key words:** morphology, morphometric measurements, meristic counts, water warming

NUOVE SEGNALAZIONI DI PESCE FLAUTO, *FISTULARIA COMMERSONII*  
(OSTEICHTHYES: FISTULARIDAE), MIGRANTE LESSEPSIANO, AL LARGO DELLA COSTA  
DELLA TUNISIA (MEDITERRANEO CENTRALE)

SINTESI

*Quattordici individui di Pesce Flauto, *Fistularia commersonii*, sono stati avvistati nelle acque marine della Tunisia, il che fa ipotizzare che la specie si sia stabilita con successo nell'area. Tutti gli esemplari sono stati catturati al largo di Ras Jebel. Tali catture rappresentano il punto più settentrionale di estensione della specie al largo della costa tunisina. *F. commersonii* è una specie altamente carnivora ed il suo ruolo negativo nell'ambiente biologico non può venir trascurato.*

**Parole chiave:** morfologia, misurazioni morfometriche, conteggi meristici, riscaldamento del mare

## INTRODUCTION

The bluespotted cornetfish *Fistularia commersonii* (Rüppel 1835) is a reef-associated species widely distributed in the Indo-Pacific, first recorded in the Mediterranean by Golani (2000). This new Lessepsian migrant (*sensu* Por, 1978) quickly expanded in the eastern Mediterranean (Golani *et al.*, 2002), and was classified by Karachle *et al.* (2004) as a "Lessepsian sprinter". *F. commersonii* was first recorded in the central Mediterranean by Azzurro *et al.* (2004) off Lampedusa Island, located 167 km from the eastern Tunisian coast, where it was further recorded by Ben Souissi *et al.* (2004) and Charfi-Cheikhronha (2004). The species migrated westward and was reported in relative abundance off the Algerian coast, between Tunisian and Moroccan borders (Hemida & Capapé, 2009). Additionally, *F. commersonii* was also reported in Libyan marine waters by Shakman & Kinzelbach (2007) and Elbaraasi & Elsalini (2009)

who noted that the establishment of the species in the area still remains difficult to determine. Recent observations reported by Deidun & Germanà (2011) showed increasing numbers of records of *F. commersonii* in the central Mediterranean, especially within the coastal waters of Sicily and off the Maltese Islands.

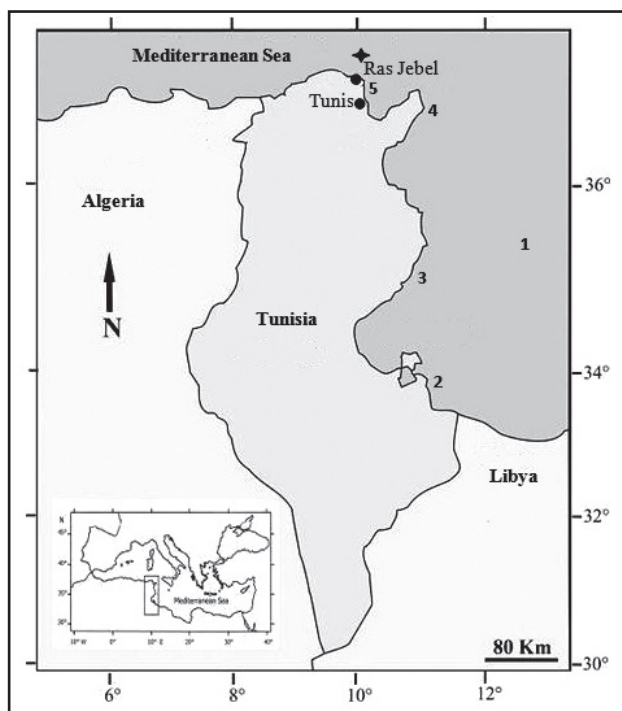
Additionally, *F. commersonii* constitutes a threat for native ecosystem because it is both an active feeder and a highly carnivorous species which considerably increases competition pressure with autochthonous species, mainly teleosts (Kalogirou *et al.*, 2007). Such pattern could have a double negative impact, firstly ecological and secondly economic; fistularid species having low selling prices as observed in western African fishmarkets (Diatta *et al.*, 2009; Y. Diatta, *pers. comm.*).

The aim of this note is to present new additional records of bluespotted cornetfish during investigations conducted in northeastern Tunisian marine waters since June 2006 and to comment on the distribution extension of this Lessepsian migrant off the Tunisian coast and in the Mediterranean.

## MATERIAL AND METHODS

All observed specimens were collected between 30 October 2010 and 24 September 2011, off Ras Jebel (37°19'32.04" N, 10°13'35.18" E), a city located approximately 60 km north of Tunis, by commercial gill-nets with 30 mm mesh size, at a depth of 8m. The habitat was a rocky bottom covered by algae, concomitantly with sparid and labrid species (Fig. 1).

All fresh specimens were identified following Golani (2000), Golani *et al.* (2002) and Hemida & Capapé (2009), and photographed. Morphometric measurements were recorded to the nearest millimetre, while total mass, masses of liver and gonads to the nearest decigram. The genital tract of each specimen was first examined under binocular microscope. The stomach contents were removed, sorted and weighed to the nearest decigram. The items were identified to the lowest



**Fig. 1:** Map of Tunisia showing the capture sites of *Fistularia commersonii* in the region. Black star: off Ras Jebel (this study); 1 - off Lampedusa Island (see Azzurro *et al.*, 2004); 2 - off Zarzis; 3 - off Sfax; 4 - off Kelibia (see Ben Souissi *et al.*, 2004); 5 - off Raf-Raf (see Charfi-Cheikhronha, 2004).

**Sl. 1:** Zemljevid Tunizije z označenimi točkami ulova primerkov *Fistularia commersonii*. Črna zvezda: pri mestu Ras Jebel (to delo); 1 - ob otoku Lampeduza (glej Azzurro *et al.*, 2004); 2 - pri mestu Zarzis; 3 - pri mestu Sfax; 4 - pri mestu Kelibia (glej Ben Souissi *et al.*, 2004); 5 - pri mestu Raf-Raf (glej Charfi-Cheikhronha, 2004).



**Fig. 2:** *F. commersonii* (ref. FSB-Fis-com 01) captured in Tunisian marine waters (scale bar 50 mm).

**Sl. 2:** *F. commersonii* (ref. FSB-Fis-com 01), ujeta v tunizijskih vodah (merilo 50 mm).

possible taxon using keys and fields (Riedl, 1963; Perrier, 1964, 1975; Fischer *et al.*, 1987).

All specimens were preserved in 10% buffered formalin and deposited in the Ichthyological Collection of the Faculté des Sciences of Bizerte (Tunisia), receiving catalogue numbers from FSB-Fis-com 01 (Fig. 2) to FSB-Fis-com 14.

## RESULTS AND DISCUSSION

The identification of the collected *Fistularia commersonii* was made as follows: skin entirely smooth with lack of both bony plates along midline of back and of spines in ossifications of the posterior lateral line, and on the occurrence of strongly serrate ridges on both edges of snout; body extremely depressed with a narrow tubular snout; dorsal and anal fins similar and triangular, posterior in position, opposite each other; caudal fin forked, with two very elongated and filamented middle rays. Colour brownish to olive-green with blue spots on the back. Belly beige, fins rather translucent and transparent

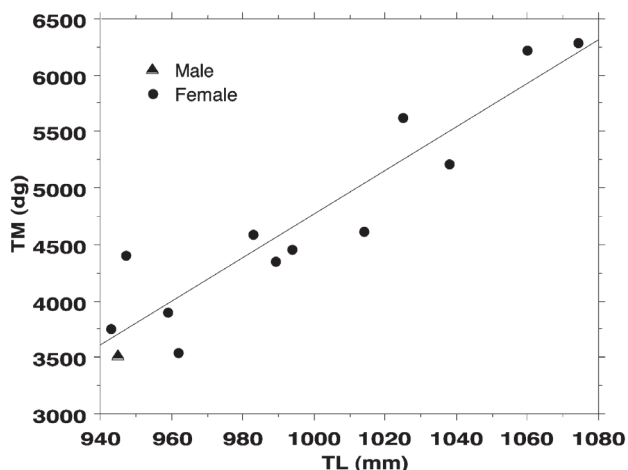
at base, with orange cast. Morphometric measurements, meristic counts of two specimens are given in Table 1. They agree with the description and colour provided by Golani (2000), Golani *et al.* (2002) and Hemida & Capapé (2009).

Of the 14 collected specimens, 12 were females and 2 males. All were large specimens ranging in size between 943 and 1074 mm total length, and weighing between 3516 and 6284 dg total mass. Of the 14 guts examined, 7 were empty, the other 7 contained remains of bony fishes. Namely, in four of them, we have identified bogue *Boops boops* (Linnaeus 1758), black goby *Gobius niger* (Linnaeus, 1758) and an unidentified sparid species (Tab. 2). These observations show that *F. commersonii* is a higher order carnivore, a piscivorous species in agreement with Kalogirou *et al.* (2007). All females exhibited a single ovary occupying the internal cavity of the body in its length and constituted in two fused lobes divided by a longitudinal septum of connective tissue in agreement with Azzuro *et al.* (2004); the ovary contained pre-vitellogenic oocytes. These females

**Tab. 1: Morphometric measurements, in mm and percent of standard length (% SL), meristic counts and masses recorded in both specimens of *Fistularia commersonii* (ref. FSB-Fis-com 01 and FSB-Fis-com 02) captured in Tunisian marine waters.**

**Tab. 1: Morfometrični podatki, v mm in odstotkih standardne dolžine (% SL), meristični podatki in mase, izmerjeno za oba primerka *Fistularia commersonii* (ref. FSB-Fis-com 01 in FSB-Fis-com 02), ujeta v tunizijskih vodah.**

Reference	FSB-Fis-com 01		FSB-Fis-com 02	
	mm	% SL	mm	% SL
Morphometric measurements				
Total length without filaments	847	104.8	811	103.7
Total length including filaments	989	122.4	943	120.5
Standard length	808	100.0	782	100.0
Pre-dorsal fin length	673	83.3	650	83.1
Pre-pectoral fin length	302	37.3	284	36.3
Pre-anal fin length	673	83.3	647	82.7
Snout length	221	27.3	208	26.5
Longitudinal ocular diameter	23	2.8	21	2.6
Vertical ocular diameter	10	1.2	8	1.05
Dorsal fin length	26	3.5	27	
Pectoral fin length	17	2.1	16	2.0
Anal fin length	29	3.6	26	3.3
Body height	25	3.0	22	2.8
<b>Meristic counts</b>				
Dorsal soft fin rays	15		15	
Pectoral soft fin rays	14		14	
Anal soft fin rays	14		15	
Caudal soft fin rays	16		16	
<b>Masses (g)</b>				
Total body	435.0		375.1	
Eviscerated body	372.6		341.7	
Liver	10.3		8.4	
Ovary	4.2		2.4	
Stomach content	9.4		6.3	



**Fig. 3: Relationship between total length (TL) and total mass (TM) in *F. commersonii* captured off Ras Jebel (northern Tunisia).**

**Sl. 3: Razmerje med celotno dolžino (TL) in celotno maso (TM) primerkov *F. commersonii*, ujetih pri kraju Ras Jebel (severna Tunizija).**

were probably pre-spawning specimens. Both males observed were immature specimens.

The relationship total length (TL) vs. total mass (TM) is plotted (Fig. 3):

$TM (dg) = -14506.344 + 19.273 \cdot TL (mm)$ ,  $n = 14$ ,  $r = 0.93$ ; it suggests that the species found sufficient food in the wild to develop.

The first record of *F. commersonii* in the central Mediterranean occurred on 20 December 2002 off Lampedusa Island (Azzurro et al., 2004), the other specimens from the close Tunisian coast were collected on November 2002 off Zarzis, on October 2003 off Sfax and Kelibia, respectively (Ben Souissi et al., 2004) and on January 2004 off Raf-Raf (Charfi-Cheikhronha, 2004). The species migrated westward and was recorded off the Algerian coast (Hemida & Capapé, 2009), and reached at present the Moroccan border (F. Hemida, pers. comm.). Deidun & Germanà (2011) noted the abundance in the Malta-Sicily shelf area, adding that sighted specimens were from 300 to 1100 mm in total length, with some being sold at the Marsaxlokk fish market, which is considered a novelty for the Maltese Islands. These reports in related areas suggest that a subsequent *F. commersonii* population is at present successfully established in the southern and central Mediterranean. Similar patterns were observed for three other teleost species in Tunisian waters, two lessepsian migrants Por's goatfish *Upeneus pori* Ben-Tuvia & Golani 1989 (Ben Souissi et al., 2005; Azzouz et al., 2010) and reticulated leatherjack *Stephanolepis diaspros* Fraser-Brüner 1940 (Ben Amor & Capapé, 2008).

The occurrence of new exotic species in Tunisian waters and other Mediterranean regions is due to the warming of Mediterranean waters, which makes this sea a catchment area for species from southern marine world regions (Ben Rais Lasram & Mouillot, 2009). *F. commersonii* could be considered as one of the best instances among teleost species because since its first re-

**Tab. 2: Observations recorded in the 13 *F. commersonii* captured off Ras Jebel (northern Tunisia) with total length (TL), total mass (TM), liver mass (LM) and gonad mass (GM).**

**Tab. 2: Podatki za 13 primerkov *F. commersonii*, ujetih pri kraju Ras Jebel (severna Tunizija) s celotno dolžino (TL), celotno maso (TM), maso jeter (LM) in maso gonad (GM).**

Record	Capture date	Sex	Condition	TL(mm)	TM (dg)	LM (dg)	GM (dg)	Stomach contents
01	30/10/2010	female	pre-spawning	989	4350	103	42	undetemined teleosts
02	28/11/2010	female	pre-spawning	943	3751	84	24	undetemined teleosts
03	03/12/2010	female	pre-spawning	1074	6284	115	70	empty
04	03/12/2010	female	pre-spawning	994	4461	95	26	empty
05	06/12/2010	female	pre-spawning	947	4400	106	68	<i>Boops boops</i> (6 dg), undetermined sparid
06	23/12/2010	female	pre-spawning	1025	5623	91	47	<i>B. boops</i> (45 dg)
07	29/12/2010	male	immature	945	3516	37	23	empty
08	09/01/2011	female	pre-spawning	983	4586	73	35	<i>Gobius niger</i> (92 dg)
09	09/01/2011	female	pre-spawning	1038	5218	89	45	empty
10	09/01/2011	female	pre-spawning	962	3547	64	34	undetemined teleosts
11	30/01/2011	female	pre-spawning	1060	6215	78	63	empty
12	30/01/2011	female	pre-spawning	959	3907	64	31	empty
13	30/01/2011	female	pre-spawning	1014	4624	-	42	empty
14	24/09/2011	male	immature	960	4035	-	32	<i>B. boops</i> (11 dg)

cord (Golani, 2000), it is known throughout the Mediterranean Sea, and at present, it is abundantly captured in the eastern Mediterranean (Golani *et al.*, 2002), the Aegean Sea (Kalogirou *et al.*, 2007) and in southern regions such as Maghreb shore; however, it is still unknown off the northern coast of Spain and southern coast of France. *F. commersonii* is a highly carnivorous species that considerably increases competition pressure with autochthonous species, mainly teleosts, which have high economic value (Kalogirou *et al.*, 2007). Additionally, *F. commersonii*, species of low economic value, feed on species of high economic value such as centracanthids, mullids and sparids (Kalogirou *et al.*, 2007).

Consequently, a relative abundance of *F. commersonii* in Tunisian marine waters and in the neighbouring areas could have a double negative impact, ecological and economic, both very negative for the local human population. Nevertheless, these nefaste consequences have not yet been demonstrated, even if they remain a suitable hypothesis.

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## NOVI PODATKI O POJAVLJANJU LESEPSKE SELIVKE, MODROPIKASTEGA TROBENTAČA *FISTULARIA COMMERSONII* (OSTEICHTHYES: FISTULARIDAE) OB TUNIZIJSKI OBALI (OSREDNJE SREDOZEMLJE)

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#### POVZETEK

Na podlagi opazovanj štirinajstih primerkov vrste modropikasti trobentač *Fistularia commersonii* iz tunizijskih obmorskih voda lahko vrsto trenutno obravnavamo kot uspešno uveljavljeno na tem območju. Vsi primerki so bili ujeti pri mestu Ras Jebel, kar predstavlja najsevernejši del območja razširjenosti vrste ob tunizijski obali. *F. commersonii* je izrazito mesojeda vrsta in njene negativne vloge v biološkem okolju ne gre zanemariti.

**Ključne besede:** morfologija, morfometrični podatki, meristični podatki, segrevanje morja

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