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OCCURRENCE OF NILSSON'S PIPEFISH *SYNGNATHUS ROSTELLATUS* (OSTEICHTHYES: SYNGNATHIDAE) IN THE GULF OF TUNIS (CENTRAL MEDITERRANEAN)

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SYNGNATHIDAE
SYNGNATHUS ROSTELLATUS
GULF OF TUNIS
NORTHERN TUNISIA
CENTRAL MEDITERRANEAN

ABSTRACT. – Nilsson's pipefish *Syngnathus rostellatus* Nilsson 1855 was recorded for the first time in the Tunisian waters (Gulf of Tunis, northern Tunisia). Morphometrical measurements, counts and a short description of the species are reported in this paper. This is the fourth finding of *S. rostellatus* in the Mediterranean, and it confirms the occurrence of the species in this sea.

INTRODUCTION

Six syngnathid species were reported to date in Tunisian waters (Ben Amor *et al.* 2006, 2007a, b): two sea-horses, *Hippocampus hippocampus* (Linnaeus, 1758) and *H. ramulosus* Leach, 1814; four pipefishes, *Nerophis ophidion* (Linnaeus, 1758), the black-striped pipefish *Syngnathus abaster* Risso, 1826, the greater pipefish *S. acus* Linnaeus, 1758, and the deep-snouted pipefish *S. typhle* Linnaeus, 1758. Recent investigations conducted in the area allow us to collect for the first time a seventh syngnathid species: Nilsson's pipefish *Syngnathus rostellatus* Nilsson, 1855.

Syngnathus rostellatus was reported off the eastern Atlantic coast off Norway and the British Isles (Wheeler 1969), in the Bay of Biscaye (Bauchot & Pras 1980) and off the coast of Portugal (Albuquerque 1954-1956); in contrast the species was unknown south of the Strait of Gibraltar (Dawson 1986). *Syngnathus rostellatus* was previously recorded three times only in the south of the Mediterranean Sea, in the Alboran Sea (southern Spain) by Reina-Hervas *et al.* (1981-1982), off Banyuls (Gulf of Lions, southern France) by Louisy (2002) and off the Anatolian coast (southern Turkey) by Gokoglu *et al.* (2004). The purpose of this paper is to report the first Tunisian *S. rostellatus*, including a short description, morphometric data and counts carried out on this specimen; then, to comment on the distribution of *S. rostellatus* in Tunisian waters and the Mediterranean Sea.

MATERIAL AND METHODS

The Tunisian *Syngnathus rostellatus* was collected in June 2006 by trawl in the Gulf of Tunis, at 40-50 m depth, on sandy

bottom (Fig. 1). The specimen is preserved in 5 % buffered formalin in the Ichthyological collection of the Faculté des Sciences of Tunis, catalogue number: FST-SYN-rostellatus-01 (Fig. 2). The comparative material was from the Ichthyological Collection of the British Museum of Natural History (BMNH) of London; it comprised 7 specimens of *S. rostellatus* (see Table I). Measurements and counts carried out on the Tunisian specimen and on seven specimens from the BMNH follow the protocol defined for pipefishes by Dawson (1982); they are plotted in Fig. 2 and summarized in Table I. Additionally, we have examined specimens of three close relative species from the genus *Syngnathus* occurring in Tunisian waters, the black-striped pipefish *Syngnathus abaster* Risso, 1826, the greater pipefish *S. acus* Linnaeus, 1758, the deep-snouted pipefish *S. typhle*. These specimens were described in previous works (Ben Amor *et al.* 2006, Ben Amor *et al.* 2007a, b).

RESULTS AND DISCUSSION

The Tunisian specimen of *S. rostellatus* examined presents the following characters: body elongate, rounded slightly compressed; head rather prominent, head-length 2.77 in pre-anal length, 6.72 in total length; snout elongate and compressed; mouth without true teeth, small, and terminal on a protruding cylindrical snout narrow and tubular and with a keel on upper surface, snout-length 1.9 in head length; post-orbitary length 3.02 in head-length; pre-dorsal length 2.52 in total length; dorsal fin slender with 35 soft rays; dorsal base 9.95 in total length; 18 trunk rings; 39 tail rings; 57 total rings; pectoral with 12 soft rays; anal with 4 soft rays; caudal with 11 soft rays. Color greyish to brownish, with darker bars on dorsal side and flanks. Belly beige with silvery sheen on head and trunk side. Dorsal fin hyaline.

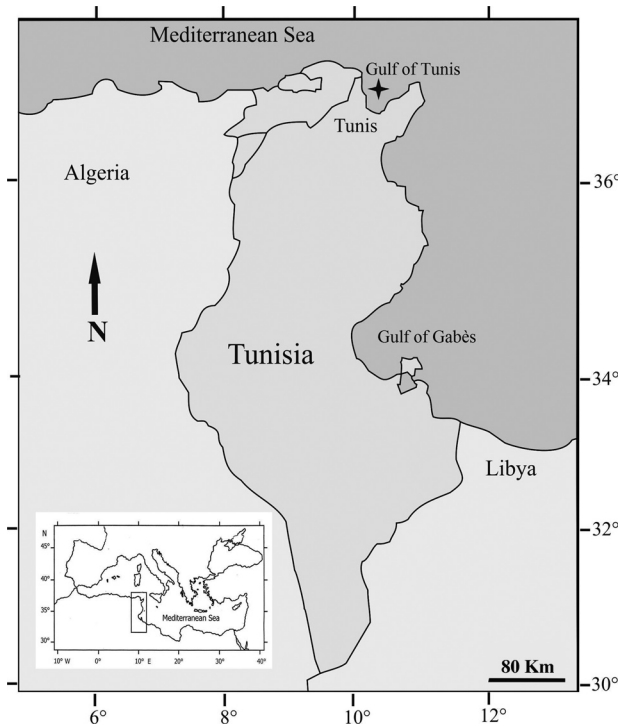


Fig. 1. – Map of the coast of Tunisia showing the capture site of *Syngnathus rostellatus* (black star).

Morphology, color and especially, counts and percentage of total length *versus* different measurements carried out in the Tunisian Nilsson's pipefish, and the seven specimens from the BMNH are very similar (see Table I). All these patterns are in agreement with Wheeler (1969), Bauchot & Pras (1980), Dawson (1986), Reina-Hervàs (1989), Louisy (2002), Quéro *et al.* (2003) and Gokoglu *et al.* (2004).

Additionally, the Tunisian *Syngnathus rostellatus* differs from the three close congeneric species recorded in Tunisian waters. In *S. rostellatus*, the caudal fin is rather pointed and its length is comprised twice in the pectoral fin length (see Table I), while in *S. abaster*, the caudal fin is rounded and its length is similar to the pectoral fin length. The median dorsal post-orbital part of head is not elevated in *S. rostellatus*, while it is clearly elevated in *S. acus*. The snout of *S. rostellatus* is cylindrical, with depth less than eye diameter, while the snout of *S. typhle* is rather compressed laterally, with depth more than eye diameter.

This new Mediterranean finding of *S. rostellatus* is the first recorded in Tunisian waters and the fourth in this sea. Additionally, it is the second teleost species migrant from the Atlantic, the first being the spotfin flyingfish, *Cheilopogon furcatus* (Mitchill 1815) according to Ben Souissi *et al.* (2005). Most of the exotic species recorded in the area were lessepsian migrants originating from the Red Sea (Ben Souissi *et al.* 2004, Bradai *et al.* 2004).

In all, six specimens were recorded by Reina-Hervàs (1989) in the Alboran Sea. The Spanish records of *S. rostellatus* could be explained by the vicinity of the Atlantic. The specimens easily entered into the Alboran Sea through the Strait of Gibraltar. Off Banyuls, Louisy (2002) recorded a single female, while off Turkey, Gokoglu *et al.* (2004) observed 4 specimens. They occurred in waters warmer than those usually required by the species to live. The non-occurrence of *S. rostellatus* during more than twenty years in Mediterranean areas between Spain and other Mediterranean areas could be explained by misidentification with close relative species. Additionally, the syngnathids have not been the focus of thorough research and they were generally discarded by fishermen due to

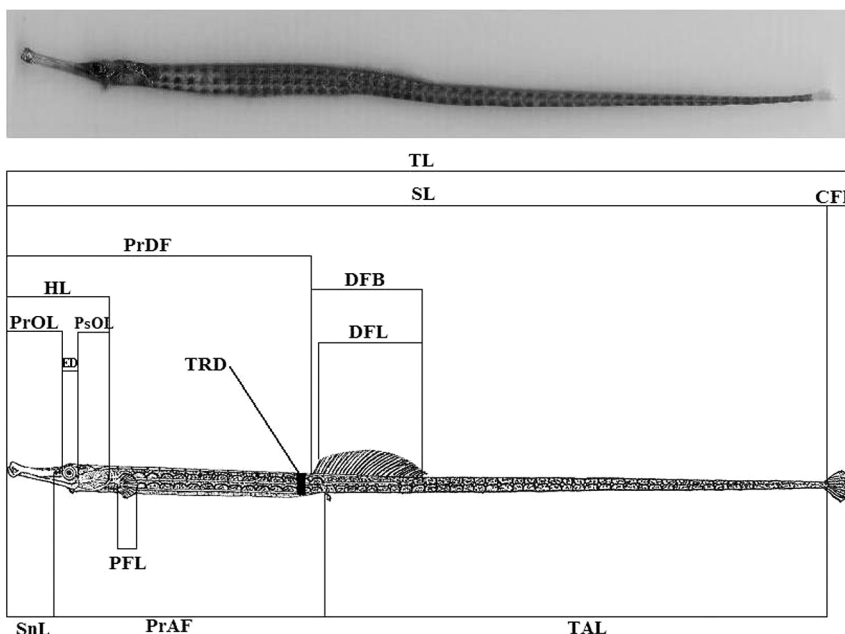


Fig. 2. – Top, *Syngnathus rostellatus* (ref FST-SYN-rostellatus 01). Bottom, Measurements carried out on *Syngnathus rostellatus* following Dawson (1982) for syngnathids. Specimen redrawn from Nijssen & Buizer (1983). CFL: caudal fin length. DFB: dorsal fin base. DFL: dorsal fin length. ED: eye diameter. HL: head length. PFL: pectoral fin length. PrAF: pre-anal fin distance. PrDF: predorsal fin distance. PrOL: pre-orbital length. PsOL: post-orbital length. Standard length (SL). SnL: snout length. TAL: tail length. TL: total length. TRD: trunk depth.

Table I. – Morphometrical measurements and counts carried out on *Syngnathus rostellatus* recorded in the Gulf of Tunis (ref FST-SYN-rostellatus 01) and on seven specimens from the British Museum of Natural History (BMNH) of London.

Reference	FST-SYN-rostellatus-01 (Female)		BMHN-1959.12.14.20 (Female)		BMHN-1960.8.24.3 (Male)		BMHN-1971.2.16.315 (Male)		BMHN-1971.2.16.317 (Male)		BMHN-1971.4.30.19 (Male)		BMHN-1983.8.3.12 (Male)		BMHN-1989.11.14.664-665 (Male)		
	mm	% TL	mm	% TL	mm	% TL	mm	% TL	mm	% TL	mm	% TL	mm	% TL	mm	% TL	
Total length (TL)	211	100.0	123	100.0	100	100.0	138	100.0	115	100.0	136	100.0	118	100.0	119	100.0	
Standard length (SL)	203	96.2	119	96.7	96	96.0	132	95.7	111	96.5	130	95.6	112	94.9	113	95.0	
Head length (HL)	31.4	14.9	16.13	13.1	13.3	13.3	16	11.6	14.31	12.4	17.29	12.7	15.25	12.9	14.67	12.3	
Inter orbital space (IO)	3.7	1.8	1.8	1.5	1.9	1.9	1.81	1.3	1.69	1.5	2.35	1.7	1.83	1.6	1.92	1.6	
Eye diameter (ED)	2.9	1.4	2.66	2.2	1.83	1.83	2.4	1.7	2.2	1.9	2.73	2.0	2.45	2.1	2.04	1.7	
Pre-orbital length (PrOL)	17.9	8.5	8.98	7.3	7.12	7.12	7.91	5.7	7.11	6.2	8.43	6.2	8.17	6.9	7.89	6.6	
Post-orbital length (PsOL)	10.4	4.9	5.29	4.3	4.77	4.77	6.39	4.6	5.45	4.7	5.98	4.4	4.62	3.9	5.24	4.4	
Snout length (SnL)	16.5	7.8	8.25	6.7	5.95	5.95	6.65	4.8	6.37	5.5	7.56	5.6	7.02	5.9	6.08	5.1	
Dorsal fin length (DFL)	23.3	11.0	20.01	16.3	16.6	16.6	23.61	17.1	19.86	17.3	23.84	17.5	18.41	15.6	19.72	16.6	
Dorsal fin base (DFB)	21.2	10.0	18.8	15.3	15.1	15.1	20.79	15.1	18.36	16.0	21.89	16.1	17.52	14.8	18.33	15.4	
Pectoral fin length (PFL)	3.92	1.9	4.37	3.6	2.75	2.75	4.29	3.1	3.9	3.4	3.97	2.9	3.39	2.9	3.4	2.9	
Caudal fin length (CFL)	7.35	3.5	5.56	4.5	3.05	3.05	5.91	4.3	5.6	4.9	7.06	5.2	5.65	4.8	6.03	5.1	
Trunk depth (TRD)	6.9	3.3	4.33	3.5	2.23	2.23	3.33	2.4	3.54	3.1	3.53	2.6	3.08	2.6	4.2	3.5	
Pre-dorsal length (PrDF)	83.7	39.7	41.8	34.0	34.39	34.39	44.38	32.2	37.7	32.8	43.53	32.0	39.99	33.9	41.45	34.8	
Pre-anal length (PrAF)	87.1	41.3	44.13	35.9	37.27	37.27	48.31	35.0	42.3	36.8	48.65	35.8	43.23	36.6	43.71	36.7	
Tail length (TAL)	123	58.3	78	63.4	62	62.0	91	65.9	72	62.6	87	64.0	73	61.9	74	62.2	
Counts																	
Dorsal fin soft rays (D)	35		42		39		38		41		42		38		36		36
Pectoral fin soft rays (P)	12		13		12		11		12		12		11		11		11
Anal fin soft rays (A)	4		4		3		4		4		4		4		4		4
Caudal fin soft rays (C)	11		11		11		10		10		11		10		10		10
Trunk ring (TR)	18		14		13		15		14		14		15		15		15
Tail ring (TAR)	39		39		39		40		39		39		39		39		37
Under dorsal ring	9		11		11		11		11		11		9		10		10

their low economic interest. Nevertheless, the four records (off eastern Spain, southern France, Turkey and Tunisia) do not constitute sufficient data to state whether sustainable *S. rostellatus* populations are definitively established in the Mediterranean Sea.

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