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ATYPICAL CHARACTERISTICS IN THE LONGNOSED SKATE *DIPTURUS OXYRINCHUS* (LINNAEUS, 1758) FROM THE COAST OF SYRIA (EASTERN MEDITERRANEAN)

SUMMARY

A specimen of sharpnosed skate *Dipturus oxyrinchus* (Linnaeus, 1758) presenting snout and tail abnormalities was captured off the Syrian coast. It is an adult female with a shortened and rounded snout, lack of second dorsal fin and a reduced and rounded caudal fin. This abnormal specimen is described in the present note, and it appears that both snout and tail abnormalities did not affect their development and they reached similar parameters and swimming activities than the normal ones.

INTRODUCTION

Sharpnosed skate *Dipturus oxyrinchus* (Linnaeus, 1758) is continuously reported off the eastern Atlantic side from Norway to Portugal (Wheeler, 1969; Quéro *et al*., 2003). South the Strait of Gibraltar, the species occurred off Morocco (Lloris and Rucabado, 1998), Blache *et al*. (1970) noted the species occurrence off Madeira the coast of Mauritania appears to be its southernmost extension range (Maurin and Bonnet, 1970). The species is known in the Mediterranean Sea (Serena, 2005), however a drastic decline of captures was observed off the Languedocian coast of France, whre the species was abundantly caught (Quignard, 1965). Capapé *et al*. (2006) noted the capture of a single juvenile female on 23 June 2006, and since, no other specimen was recorded to our knowledge, although investigations were regularly conducted in the area. Conversely, *D.oxyrinchus* is abundantly reported in the

central Mediterranean, off Sardinian coast and southern Tunisia where studied were carried out concerning reproductive biology, diet and feeding habits and some traits of its morphology (Baino et al., 2001; Serena *et al*., 2010; Cabiddu *et al*., 2012; Kadri *et al*., 2014, 2015; Mulas *et al*., 2015). The species also occurs in the Adriatic Sea (Lipej and Dulcic, 2010), the Aegean Sea (Yigin and Ismen, 2010) and appears to be rather abundant in the eastern Mediterranean (Golani, 2005), especially off the coast of Syria (Saad *et al*., 2004). Investigations conducted in the latter area since a decade allow us to find an abnormal specimen which is described in the present paper. The origin of such abnormalites are discussed and commented with special regard to *D. oxyrinchus* and more generally for skates.

MATERIAL AND METHODS

An abnormal specimen *Dipturus oxyrhinchus* was caught on 09 April 2015, by demersal trawl, at a depth between 35 and 90m, on sandy bottom, 12 km southwest off coast Lattakia city, by 35° 41´ E and 35° 29´ N. Additionally, 57 normal specimens were collected during surveys carried out in the Syrian waters, between April 2013 and September 2014. They were mostly collected on muddy-sandy and rocky bottoms, at depths between 90 and 250 m, using a bottom longline of strong nylon rope with hooks n°12-14, baited with small fishes, following information provided by experienced fishermen who are aware of fishing grounds in the area (Fig. 1). Specimens delivered to the laboratory for later study and identification followed Stehmann and Bürkel (1984), Louisy (2002), Quéro *et al*. (2003), Serena (2005) and Serena *et al*., 2010. The rear piece of the specimen tail was preserved in 10% buffered formalin and deposited in the Ichthyologyical Collection of the Marine Sciences Laboratory, Agriculture Faculty at Tishreen University, Syria under the catalogue number: 1277 M.S.L (Fig. 2). The specimen was an adult female, the ovaries weight was 128.8g, and the largest oocyte diameter was 23 mm. The liver weight was 53.7g, and the stomach contents was constituted by teleosts and crustaceans, partially digested and therefore unidentified.

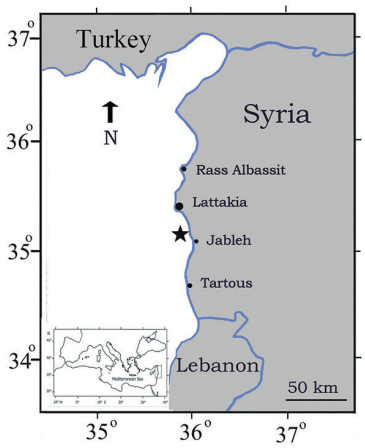

Fig. 1. Captures sites (black star) of the abnormal *Dipturus oxyrinchus* from the coast of Syria.

M.S.L	1277	
Morphometric measurements	mm	% DW
Disk width	582	100.0
Disk length	530	91.1
Snout tip to max. disc width	333	57.2
Total length	785	134.9
Snout tip to eye	192	33.0
Pre-orbital length	183	31.4
Interorbital width	46	7.9
Eyeball length	20	3.4
Cornea	5	0.9
Interspiracular width	65	11.2
Spiracle width	11	1.9
Spiracle length	12	2.1
Pectoral fin anterior margin	409	70.3
Pectoral fin posterior margin	296	50.9
Pectoral fin inner margin	42	7.2
Snout prenasal length	172	29.6
Snout tip to first dorsal fin	711	122.2
First dorsal fin base length	50	8.6
First dorsal fin height	19	3.3
Space between rear end first dorsal fin and the origin of second dorsal fin	4	0.7
Snout tip to curtain tip	214	36.8
Curtain width	72	12.4
Preoral length	193	33.2
Snout tip to mouth	211	36.3
Mouth width	66	11.3
Pelvic fin external margin of anterior lob	76	13.1
Pelvic fin inner margin of anterior lob	48	8.2
Pelvic fin external margin of posterior lob	81	13.9
Pelvic fin inner margin of anterior lob	41	7.0
Snout to middle of cloaca	502	86.3
Tail base width	26	4.5
Middle of cloaca to tail top	283	48.6
Internasal width	69	11.9
Total weight (g)	2465	

Table 1. Morphometric measurements (mm and as % DW) recorded in the abnormal specimen of *Dipturus oxyrinchus* collected from the coast of Syrian.

State	Abnormal		Normal		Normal		Normal		Normal		Normal	
Sex	Female		Female		Female		Female		Female		Female	
Maturity	Adult		juvenile		juvenile		juvenile		juvenile		juvenile	
Measurements	mm	% DW	mm	% DW	mm	% DW	mm	% DW	mm	% DW	mm	% DW
Disk width	582	100.0	252	100.0	260	100.0	340	100.0	320	100.0	300	100.0
Disk length	530	91.1	199	79.0	219	84.2	290	85.0	273	86.1	274	91.9
Total length	785	134.9	355	140.9	358	137.7	480	140.8	449	141.6	456	153.0
Snout tip to eye	192	33.0	96	38.1	105	40.4	134	39.3	134	42.3	120	40.3
Pre-orbital length	183	31.4	85	33.7	91	35.0	115	33.7	115	36.3	112	37.6
Interorbital width	46	7.9	21	8.3	22	8.5	30	8.8	28	8.8	27	9.1
Interspiracular width	65	11.2	27	10.7	29	11.2	38	11.1	35	11.0	35	11.7
Pectoral fin anterior margin	409	70.3	177	70.2	185	71.2	240	70.4	231	72.9	230	77.2
Pectoral fin posterior margin	296	50.9	117	46.4	124	47.7	170	49.9	152	47.9	143	48.0
Pectoral fin inner margin	42	7.2	24	9.5	30	11.5	33	9.7	33	10.4	40	13.4
Snout tip to first dorsal fin	711	122.2	293	116.3	317	121.9	393	115.2	376	118.6	382	128.2
First dorsal fin base length	50	8.6	21	8.3	22	8.5	25	7.3	24	7.6	25	8.4
First dorsal fin height	19	3.3	9	3.6	8	3.1	16	4.7	12	3.8	11	3.7
Snout tip to curtain tip	214	36.8	93	36.9	99	38.1	125	36.7	126	39.7	120	40.3
Snout tip to mouth	211	36.3	96	38.1	92	35.4	118	34.6	118	37.2	115	38.6
Mouth width	66	11.3	27	10.7	27	10.4	35	10.3	32	10.1	35	11.7
Snout tip to vent	502	86.3	185	73.4	196	75.4	255	74.8	245	77.3	245	82.2
Tail length	283	48.6	157	62.3	177	68.1	210	61.6	194	61.2	210	70.5

Table 2. Comparison of some measurements in the abnormal specimen and 5 normal specimens of *Dipturus oxyrinchus* collected from the coast of Syrian.

During the study, all measurements and percents of disc width (DW) were recorded to the nearest millimeter and weights to the nearest gram (Table 1). The abnormal specimen was included in Table 2 for comparison related to tail with five normal specimens. The relationship total length (DW) *versus* total body weight (TBW) was used as a complement for studies following Froese *et al*. (2011), to assess if a species is able to develop normally in its life area, such patterns concern both abnormal and normal specimens. Disc width was chosen as reference length rather than total length, as recommended by Clark (1926) for studies concerning batoid species. This relationship was expressed in decimal logarithmic coordinates and correlations were assessed by least-squares regression, to obtain a linear regression.

RESULTS AND DISCUSSION

The abnormal specimen measured 582mm disk width (DW) and weighed 2465g (Fig. 2), it was an adult female exhibitind large yolky oocytes (Fig. 3). The specimen presented the following morphological characters: disk rhomboid, with anterior margin concave and posterior margins rather convex; snout long but not pointed as in normal specimen, stout and rounded in its distal end, rostral crests thick and continuously separated form each other until snout tip (Fig. 4), dorsal surface smooth, upper snout and median area of disk rather spinoulous, tail rather shortened due to the fact that the second dorsal fin is lacking, and presence of a rudimentary caudal fin, abruptly rounded in its distal end, but entirely covered by dermal denticles (Fig. 5), no scar was observed. No thorns were observed on disck, except small thorns in front of eyes, 11 thorns were counted along the tail. Dorsal surface brownish with darker and lighter spots, ventral surface brownish to greyish with mucous pores marked by black notches and dark-convoluted streaks.

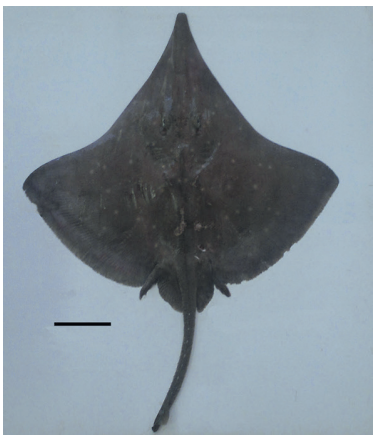

Fig. 2. Dorsal surface the abnormal *Dipturus oxyrinchus* tailless specimen, scale bar = 100 mm.

Loss of part or total tail due to injury are quite frequent especially in stingrays, but rather rare in skates (Tempelman, 1965; Ishiara *et al*., 1993; Mnasri *et al*., 2009; Orlov, 2010). Folllowing Orlov (2010), the tailless specimens exhibited scar at the end of the tail, related with predation by sharks or other voracious teleost species, during a competition pressure for food. It is a new

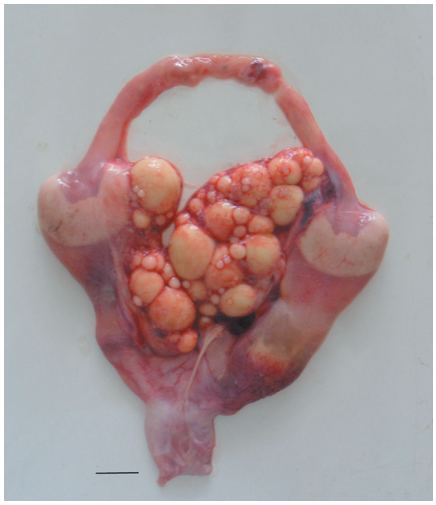

Fig. 3. Genital tract of the abnormal *Dipturus oxyrinchus,* showing large yolky oocytes, scale bar = 10mm.

case of abnormality in the posterior region of the tail, similar to those previously decribed in the thornback ray *Raja clavata* Linnaeus, 1758 by Capapé *et al*. (2015).

Abnormalities of tail in batoid species are rather rare, less than 4% according to Orlov (2010), and few instances were recently reported, 1.24% for the present study. Mnasri *et al*. (2010) recorded from the Lagoon of Bizerte a speckled ray *R. polystigma* Regan, 1923 with a tail forked at its distal end. Ben Brahim and **C**apapé (1997) found in the same area a *T. torpedo* having a surnumerary dorsal fin, located at the beginning of the tail, and showing an adipose internal structure. Similar atypical characteristics were observed by Bureau (1890) in *R. clavata* from France, Nunes and Piorski (2009) in smooth buterfly ray *Gymnura micrura* (Bloch and Schneider, 1801) from Brazil. Additionally, Deli Antoni *et al*. (2012) describe yellownose skate *Zearaja chilensis* (Guichenot, 1848), from southern Argentina, a supplementary appendage, having rather the shape of a dorsal fin, supported by cartilaginous rays, and located on the dorsal surface of the disc.

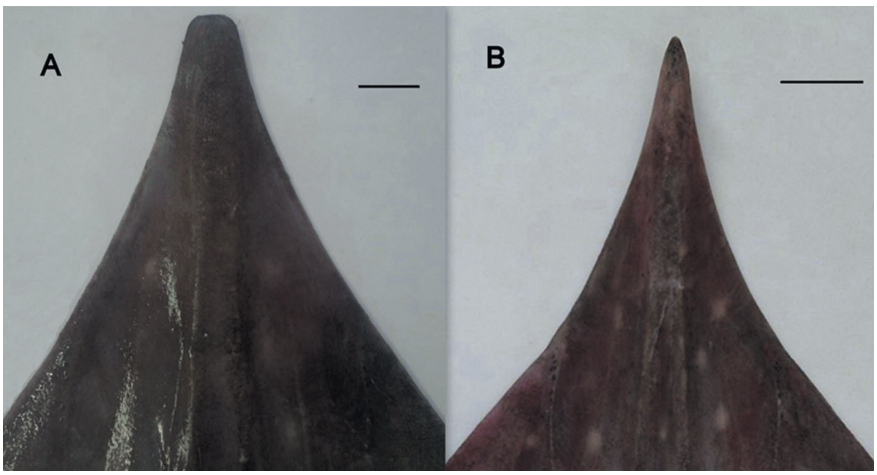

Fig. 4. Comparison of snout in the abnormal specimen (A, scale bar =20mm) and a normal specimen (B, scale bar =20mm) of *Dipturus oxyrinchus*.

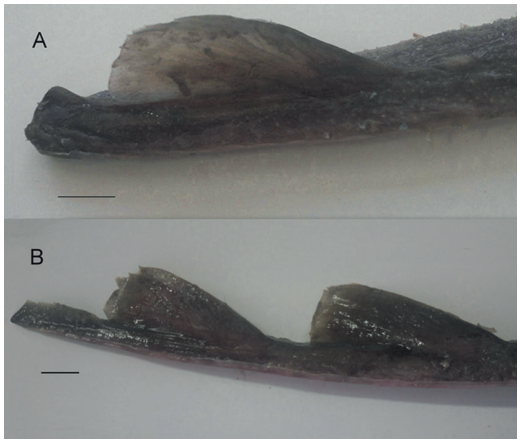

Fig. 5. Comparison of distal end of tail in the abnormal specimen (A, scale bar =10mm) and a normal specimen (B, scale bar =10mm) of *Dipturus oxyrinchus*.

Ribeiro-Prado *et al.* (2008) considered three cases of abnormalities in elasmobranch species that concerned colouration (full or partial albinism), the genital apparatus (normal or abnormal hermaphrodism), and morphological deformities (teratological cases or monstrosities). Among these latter, abnormalities of pectoral fins occured most frequently in batoid species (Ribeiro-Prado *et al.*, 2008) and reached 50% of cases (Orlov, 2010). Such phenomenon is due to the fact pectoral fins failed to fuse together in front of the head in early development (Mnasri *et al.*, 2010). Bensam (1965) noted that embryonic deformities could be caused by intrauterine pressure exerted by other embryos.

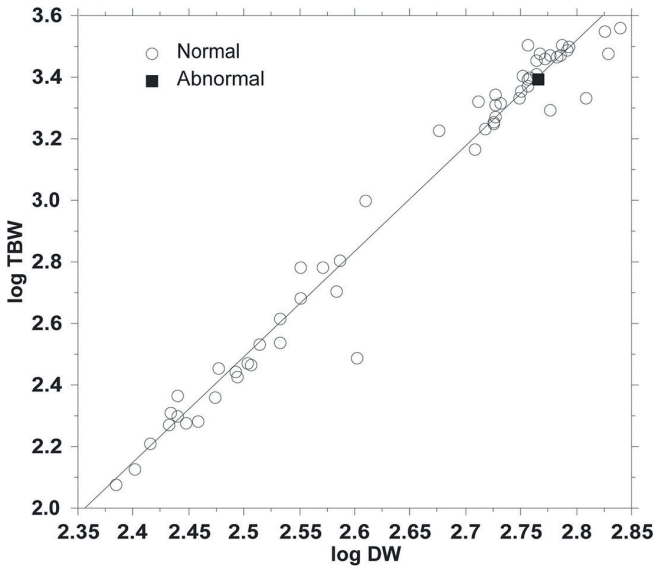

Fig. 6. Relationship total body mass (TBM) *versus* disk width (DW) expressed in arithmetic co-ordinates for normal and abnormal specimens of *Dipturus oxyrinchus* collected from the Syrian coast.

In total accordance with Orlov (2010), the present specimen described herein was not considerably affected by snout and tail abnormalities since did not affect their development and swimming activities, although percents of tail length *versus* disc width were significantly lower in the abnormal specimen than those recorded in normal specimens (Table 2), with *t*-test = 19.96, df = 5, $p < 0.001$. It is well known that skates and rays generally use pectoral fins for locomotion. These observations are corroborated by the relationship disc width *versus* total body weight, plotted in Fig. 6, which showed that abnormal specimens reached similar parameters that the normal ones. Several hundreds of specimens of *D. oxyrinchus* were observed in previous papers (see Kadri *et al*., 2014), no atypical characteristics were reported, therefore the present specimen should considered as the first abnormal case recorded for the species concomitantly displaying deformities in snout and tail, confirming one more time the rarity of such pattern in elasmobranchs.

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