

## RANGE EXTENSION OF ADEN TORPEDO (*TORPEDO ADENENSIS*) INTO PAKISTAN COAST (NORTHERN ARABIAN SEA)

MUHAMMAD MOAZZAM<sup>1</sup> AND HAMID BADAR OSMANY<sup>2</sup>

<sup>1</sup>\*WWF-Pakistan, D-35 Block 6, PECHS, Karachi 75400, Pakistan

<sup>2</sup>Marine Fisheries Department, Government of Pakistan, Fish Harbour, West Wharf, Karachi 74000, Pakistan

\*Corresponding author email: mmoazzamkhan@gmail.com

خلاصہ

عدن تارپیڈو (تارپیڈو عدنیہ) کو تیسری بار، اسیٹیمین اور مینیلو (2002) کو خلیج عدن میں محدود سمجھا جاتا تھا تاہم 28 نومبر 2013 کو کراچی کے ماہی بندر سے ایک نر (کل لمبائی 530 ملی میٹر) کو حاصل کیا گیا جس سے اس کی پھیلاؤ کی حد پاکستان کے ساحل (بحیرہ عرب) تک ہو گئی ہے۔ اس کے اشکالی اعداد و شمار کا موازنہ ہو لوٹا نیپ سے کیا گیا جس سے یہ ظاہر ہوا کہ پاکستان سے حاصل شدہ نمونہ خلیج عدن میں پائے جانے والے عدن تارپیڈو سے مطابقت رکھتے ہیں۔

### Abstract

*Torpedo adenensis* Carvalho, Stehmann and Manilo 2002 (Aden torpedo) was considered to an endemic species in the Gulf of Aden, however, a male (530 mm TL) was collected from Karachi Fish Harbour on 28 November, 2013 which extends its distribution range to coast of Pakistan (Northern Arabian Sea). A comparison of morphometric data was made with holotype and paratypes which indicates that specimen from Pakistan comes in conformity with *Torpedo adenensis* described from Gulf of Aden.

**Keywords:** Electric rays, *Torpedo adenensis*, Gulf of Aden, Arabian Sea, range extension

### Introduction

Electric rays belonging to genus *Torpedo* was represented by 4 species including *T. fuscomaculata* Peters 1855, *T. marmorata* Risso 1810 (misidentifications), *T. panthera* von Olfers, 1831, *T. sinuspersici* von Olfers, 1831 and *T. zugmayeri* Englehardt, 1912 (Bianchi, 1985; Carballo *et al.*, 2002; Moazzam and Osmany, 2021; Psomadakis, *et al.* 2015).

During the study of marine fish fauna of Pakistan, a specimen of electric ray that has plain orange-brown disc that lacks with no any distinctive spots, blotches, or reticulations on 28 November, 2013. The specimen is identified as *Torpedo adenensis* Carvalho, Stehmann and Manilo 2002. Present paper gives the details of the specimen of Aden torpedo collected from Pakistan.

### Materials and Methods

The specimen was collected from Karachi Fish Harbour which is the largest fish landing center for domestic fleet operating along coastal and offshore waters of Pakistan. Samples collected from the harbour, were photographed and salient features and measurement are recorded, before, their preservation in 5 % neutralized formalin. The specimen was sent to Departamento de Zoologia, Instituto de Biociencias, Universidade de Sao Paulo, Brazil for deposition.

### Result and Discussion

Electric rays are mainly caught as bycatch of shrimp trawling. The specimen of an electric ray was collected from the bycatch of shrimp trawler on 28 November 2013. Its colour was light reddish dorsal coloration and lacks any additional markings. It was identified as *Torpedo adenensis*. The details of its morphological characters are studied and presented in this paper.

*Torpedo adenensis* Carvalho, Stehmann and Manilo 2002

(Fig. 1-4)

Synonymy:

*Torpedo* sp.: Manilo, 1997: 11 (listed).

*Torpedo adenensis* Carvalho *et al.*, (2002). American Museum Novitates No. 3369: 1-34.

Type Location: Gulf of Aden, close to shore of Yemen, northwestern Indian Ocean, 15°15'03"N, 52°00'04"E, depth 125-140 meters (Carvalho *et al.*, 2002).

Type Specimens: Holotype: ZMUAS 5121 (housed in Zoological Museum of the Ukrainian Academy of Sciences, Kiev). Paratypes: AMNH 231441 (1) (housed in Department of Ichthyology, Division of Vertebrate Zoology, American Museum of Natural History, New York (ZMH 123432 [ex ISH 4-1993] (1) (housed in Zoologisches Institute and Museum, University at Hamburg, Hamburg); ZMUAS 5121 (1), 5418 (1) (Carvalho *et al.*, 2002).

### Description:

**Date of collection:** 28 November 2013

**Location of collection:** Karachi Fish Harbour, Pakistan

**Morphometric Measurements:** Table 1.

### Morphology

**Disc:** Typically round with anterior margin almost straight but with median protuberance (Fig1). It is wider than long (width ranging from 61.32 % of TL. Preorbital snout length about 4.34 % of disc length and prenasal length 4.53 % of TL

**Eyes:** As described by Carvalho *et al.*(2002). Its diameter ranging from 2.08 % of TL, much smaller than spiracles (Fig. 2b). Distance between eyes greater than inter-spiracular distance

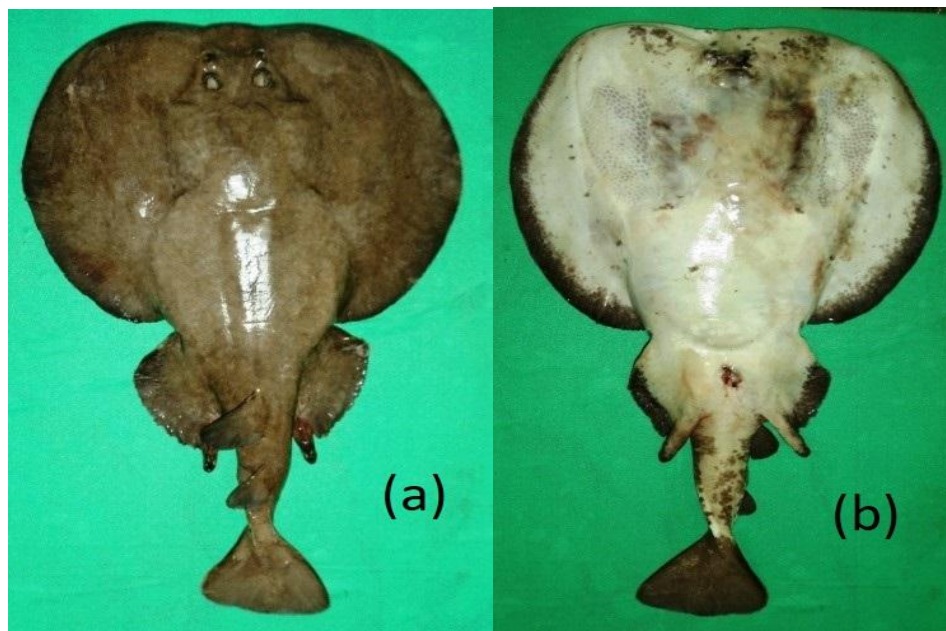
**Spiracles:** As described by Carvalho *et al.*(2002). These are large and rounded, with slightly elevated rims (Fig. 2b).

**Electric organs:** outline, in dorsal view, not clearly visible, but visible in ventral view. Inner margin concave posteriorly and with outer contours convex.

**First gill slit:** As described by Carvalho *et al.*(2002).

**Nasal curtain:** As described by Carvalho *et al.* (2002). Its posterior margin with a slight median lobe. Nostrils with prominent folds (Fig. 2a).

**Mouth:** arched, with a relatively large gape (Fig. 2a).



**Fig. 1** *Torpedo adenensis*. (a) dorsal view; (b) ventral view.

**Table-1. Proportional Morphometrics of *Torpedo adenensis*, (in mm).**

Measurement	Holotype (ZMUAS 5121-109204)	Paratype ZMUAS 5121-109203)	Paratype ZMUAS 5418	Paratype AMNH 231441	Paratype ISH 4-1883	Collected specimen from Pakistan (28 November 2013)
Sex	Mature male	Mature male	Mature male	Female	Sub adult Male	Mature Male
Unit	Mm	mm	mm	mm	mm	mm
TL	407	397	390	295	277	530
Disc Width	263	266	244	173	184	325
Disc Length	213	220	219	158.5	151	260
Snout length Preorbital	28	33.3	31.1	20.5	20.5	23
Snout length Preoral	38.3	37	33.4	23	24	41
Snout length Prenasal	25.4	25.6	21.5	17.2	19.2	24
Eye diameter	12.1	12.7	11.2	8.2	9.4	11
Interorbital length	17	15	15	9	13.5	35
Spiracle cavity length	19.3	15.7	16	12.8	12.6	17
Spiracle opening length	14.6/12.0	7.7	11.4	8.5	9.3/8.7	11
Interspiracular width	19.7	18.3	17.9	14.4	14.8	24
Orbit +Spiracle length	34	31	30.2	22	23.5	28
First dorsal height	41.3	41.5	38.5	22.5	24	58
First dorsal base length	26.7	29	31.3	19.2	30	34
Second dorsal height	28	23.7	28	16.2	18.6	37
Second dorsal base length	18	19	19	14.5	14	24
Interdorsal space	16.6	13.5	11.5	11	6	28
Space second dorsal to upper caudal	22	21.5	19.8	16	14	27
Caudal fin overall height	66.8	62.5	54	41.5	34.7	103
Caudal fin upper lob height	30.8	32	29	22	17.8	48
Caudal fin lower lob height	34	32	26	24	16.2	55
Caudal fin upper margin length	73.5	64	60.7	42.4	43.5	80
Caudal fin lower margin length	62.7	62	57.3	45	43.5	77
Tail postdorsal length	89	86	72.4	58	56	90
Tail height at pelvic tips	19	17.5	20	12	10	
Tail width at pelvic tips	27	31.5	25	21	21	
Tail height at caudal origin	12.3	12	13.5	8	7.7	
Tail width at caudal origin	11.7	15.3	12.8	8.5	9	
Lateral tail fold length	44.0/40.0	50.0/46.0	48.5	45.5	34	
Head length ventral	135	134.5	134.5	32.2	90	
Head length dorsal	103	98	72	17.1	59.5	
Mouth width	29	28.2	28.2	7	22.3	34
Internarial width	20.3	20.2	17.3	13.3	14.5	25
Nasal curtain length	10.5	8	2	5.3	5	5
1 <sup>st</sup> gill slit length	12	13	11	10.0/7.8	8.2	15
3 <sup>rd</sup> gill slit length	14	14.2	12.8	10.2	9.6	17
5 <sup>th</sup> gill slit length	8	8.5	9.3	7.4	5	11
Pelvic fin length	96.0/92.0	97	93.5	63	57	120
Pelvic fin width	116.3	131.5	108	78	84.4	50
Clasper-cloaca length	65.0/66.5	66.5/71.5	0	0	41	93
Clasper, 1 <sup>st</sup> hemal sp.	58.0/55.0	65.0/70.0	0	0	38	60
Snout to mid-cloaca	232	235	237.5	175	163	230
Snout to first dorsal origin	250	251	256	193	180.5	320
Snout to second dorsal origin	292	284	294	220	205	370
Snout to upper caudal fin	333	324.5	327.5	250.5	230.5	510
Snout to maximum disc width	95	110	120	88	82	230
Electric organ length	92.0		78.0		121.0	100
Greatest width of Electric organ			35.0			60
Electric organ width at first gill slit	35.0		26.0		43.0	50



**Fig. 2** *Torpedo adenensis*. (a) nasoral region; (b) eye and spiracle.

**Pelvic fins:** As described by Carvalho *et al.*, (2002). Anterior margins of pelvics relatively straight, not project inglaterally

**Claspers:** As described by Carvalho *et al.*, (2002).. Claspers relatively slender (Fig. 4b-c).

**Tail:** As described by Carvalho *et al.*, (2002). Lateral tail folds ridge-like and not very prominent (Fig. 4b).

**First dorsal:** As described by Carvalho *et al.*, (2002). Posterior free lobe of first dorsal just posterior of posterior apex of pelvic fins (Fig. 3a).

**Dorsal fins:** As described by Carvalho *et al.*, (2002). Second dorsal fin more slanted and lower, with a more acute apex (Fig. 3a).

**Caudal fin:** As described by Carvalho *et al.*, (2002). Both upper and lower apices of caudal fin slightly acute (Fig. 4).

**Coloration:** As described by Carvalho *et al.*, (2002). Dorsal surface uniform and lack any markings. Ventral coloration uniform creamy-white.



**Fig. 3.** *Torpedo adenensis*. (a) dorsal fins; (b) right clasper; (c) left clasper.

**Geographic Distribution:** *Torpedo adenensis* was reported the Yemen, eastern Gulf of Aden, coastline to 140 m (Carvalho, *et al.* 2002). It was considered to be endemic in Gulf of Aden (Carvalho, *et al.*, 2016; Eschmeyer, 2021; Froese and Pauly, 2021; Manilo and Bogorodsky, 2003; Weigmann, 2016). Present paper extends its distribution to Arabian Sea coast of Pakistan. It is not a commonly occurring species in Pakistan.



**Fig. 4.** *Torpedo adenensis*. (a) Caudal fin; (b) tail.

## Remarks

Arabian Sea is known to have a well-diversified fauna of electric rays (Carvalho *et al.* 2016). Five species of electric rays of genus *Torpedo* including *T. fuscomaculata* Peters 1855, *T. marmorata* Risso 1810 (misidentifications), *T. panthera* von Olfers, 1831, *T. sinuspersici* von Olfers, 1831 and *T. zugmayeri* Englehardt, 1912 were reported from Pakistan and other parts of Arabian Sea of which two have dubious records (Moazzam and Osmany, 2021). A specimen of *Torpedo* was collected from Karachi Fish Harbour in 2013 which does not have any markings on its dorsal surface and has uniform light orange-brown colour. It was identified as *Torpedo adenensis* which was known only from Gulf of Aden. Present paper adds another species of *Torpedo* from Pakistan and extends the distribution of this species to Northern Arabian Sea.

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