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ANOMALOUS TORPEDO TREVALLY, *MEGALASPIS CORDYLA* L. (PISCES: CARANGIDAE) FOUND IN PAKISTAN

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ABSTRACT

Anomalies in fishes are not uncommon and have been reported from different parts of the world from time to time. This study presents a record of an abnormal male and an abnormal female torpedo trevally, *Megalaspis cordyla*, L. collected from Ormara, Balochistan in August 2008 and from Karachi Fish Harbour (KFH) in October 2013 respectively. Gross morphometric measurements were taken. The specimens were compared with 293 specimens (59.7% females and 40.27% males) of *M. cordyla* and found that the key characters were similar whereas, both of the abnormal specimens were lacking anterior anal spines and anal fins which are normally present in *M. cordyla*. The X-ray result indicated that the specimen collected from Ormara was a congenital deformity and in other specimen collected from KFH indicates that the spines and fins were not congenitally absent although there was some indication that the deformity may be result of an injury that might have occurred during juvenile period.

Key words: *Megalaspis cordyla*, deformity, Pakistan

INTRODUCTION

Torpedo trevally, *Megalaspis cordyla* L. is a commercially important carangid which is a pelagic, schooling species, feeding on fish and small crustaceans. Carangids are caught with hook and line, trawls, purse seine, beach seine and traps in Pakistan (Bianchi, 1985).

Skeletal deformities in fish can be result of congenital malformations, which are not uncommon in small populations, and can involve jaw or skull malformation, gill or spinal anomalies or more frequently extra pectoral fins or opercular shortening. Spinal malformations, such as scoliosis, lordosis, coiled vertebral column, missing or additional fin rays, and also bending opercle or jaw malformations have been reported previously (Divanach *et al*., 1996). Other factors can contribute to abnormal growth including poor larval diet, exposure to toxins during critical development phases and hormone manipulation (Roberts, 2012). Vitamin C (ascorbic acid) in particular has an important role in fish nutrition and is related to metabolic activity in the skeletal system, and healing (Roberts, 2012). Previously some skeletal anomalies in fishes from Karachi have been reported by Hussain (1979) and Hussain and Khatoon (2004). They found anomalious specimens of *Nematalosa nasus*, *Liza carinata*, *Valmugil cunnesisus* and *Therapan jarbua*. This study aimed to document skeletal deformations observed in *M. cordyla* found at two sites in Pakistan.

MATERIALS AND METHODS

A single *M. cordyla* individual was obtained at Ormara fish landing site in August 2008 and a second specimen was obtained from routine sampling of commercial catch at Karachi fish harbor (KFH) in October 2013. To compare abnormalities in the two specimens a total of 293 specimens 59.7% females and 40.27% males of *M. cordyla* were examined and found that the key characters were similar. Gross morphometric measurements were taken and weighed in grams on an electronic balance. For the confirmation of any skeletal deformity / anatomical deficiency, X-rays of the normal and two abnormal specimens were taken using Ge Silhouette X-ray machine with 150 kv at the Dow University of Medical & Health Sciences, Karachi.

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RESULTS AND DISCUSSION

Megalaspis cordyla is a monotypic species of the family Carangidae that has a lateral line supported by finlets. In this study, both of the normal and abnormal fish specimens examined had this distinguishing characteristic. There was no detectible difference in coloration between the individuals examined. From the morphometric measurements (Table 1) it was evident that the abnormal individuals were lacking two anterior anal spines and anal fin when compared with the normal *M. cordyla*. *M. cordyla* has 2 detached anal spines followed by 1 spine and 16 to 17 soft rays then 8 to 10 rays in the detached finlets. The abnormal specimens were lacking 2 detached and analfin in both of the specimens (Fig 2). Hussain (1979) reported gizzard shad (*Nematalosa nasus*) without and anal fin from Karachi. The fish was 165.5mm in total length and 146.2mm in standard length. The absence of anal fin was associated with slightly larger scales in the posterior part of the body and a slight shift in the position of the anus. He also found considerable changes in the muscles of the anal fin region. The deformation in anal fin seems to be a result of the absence of the pterygiophore in addition no soft anal fin rays were present and they had fewer finlets (Table 1; Fig. 1a, b). The X-ray radiograph confirmed that there is skeletal deformation present in the specimen collected from Ormara (Balochistan) whereas from the X-ray film of the specimen collected from KFH (Fig. 1c) had normal pterygiophores but the lack of anal spines and finray might be due to an injury. Any deformation in fins may lead to impaired fin elasticity that may hinder movement. But the cause of this is speculative. Some abnormalities may originate from genetic mutation resulting from chemical pollutants in water (Longwell *et al*., 1992; Lien 1997) which effect embryonic development (Brown and Nunez 1998; Vogel, 2000) or from nutritional deficiencies particularly a lack of vitamin C which may lead to complete or partial degeneration of fins (Havler, 1972). Vitamin C (ascorbic acid) has a distinctive and important role in fish nutrition and is essential for to skeletal development wound healing. Vitamin C deficiency may cause diathesis of cartilage, accompanied by the osteoid replacement of bony fish that rendered the tissue extremely vulnerable to fracture, typically at the proximal end of the spines. Generally the osteoid changes in the vertebrae are associated with decrease in radio-opacity (Ronald, 2012). Dulcic and Soldo (2005) reported that deformities from injury cannot be discounted. The abnormalities in longfin travelly, *Carangoides armatus* were reported by Jawad *et al*., (2013) from the Persian Gulf.

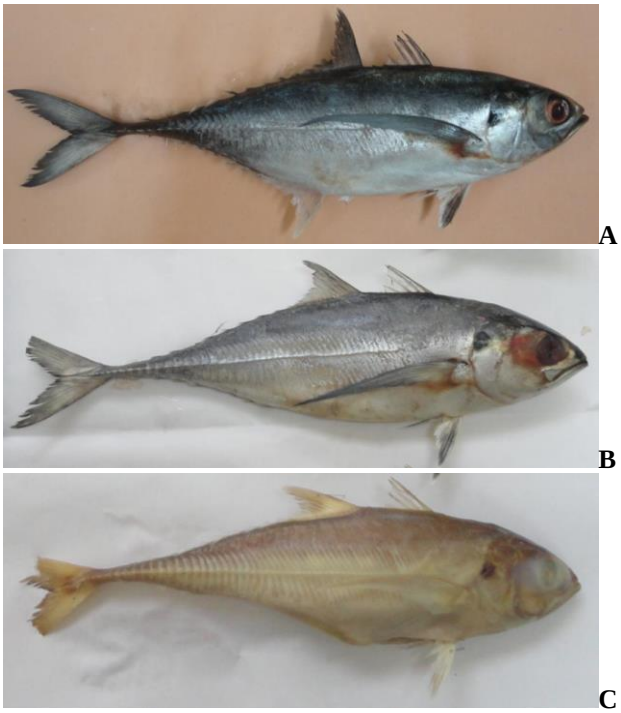

Fig. 1. Photographs of *Megalaspis cordyla* showing anomalies between normal (A) and abnormal specimens collected from Karachi fish harbour (B) and Ormara Balochistan (C).

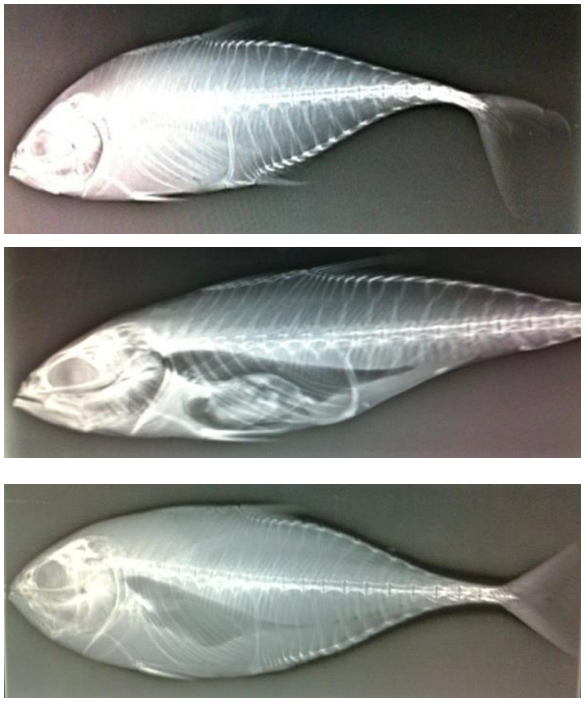

Fig. 2. X-rays photographs of whole body skeletal of *M. cordyla* (A) normal and (B & C) abnormal individuals collected from Ormara, Balochistan fish landing site and Karachi fish harbour (KFH), respectively.

Table 1. Comparison of morphometric (in cm) and meristic (in numbers) characters of normal and malformed specimens of *M. cordyla*.

Measurements (cm)	Normal Specimens (N=293)	Abnormal specimens (KFH)	Abnormal specimens (Ormara)
	♂+♀	♀	♂
Total length	18-47	34.2	26
Fork length	17-42	31.2	24.7
Standard length	15-38	28.4	21.2
Pre orbital length	0.9-2.8	1.7	2
Post orbital length	1.9-5.1	3.8	3.1
Eye diameter	0.8-2.3	1.7	1.2
Head length	3.7-9.5	5	6
Body weight (g)	36-840	364	133
Girth	10-24.5	18	13.6
Pre dorsal length	4.6-12.5	9.7	8.2
Post dorsal length	0.4-0.8	0.7	0.8
Caudal fin length	2.9-8.9	6.6	4.2
Caudal fin depth	2.7-10	6.1	3.8
DII fin rays	17-24	17	21
Pectoral fin rays	15-21	19	18
Pelvic fin rays	5	5	5
Anal soft rays	**16-17**	**0**	**0**
Caudal fin rays	20-30	24	24
Finlets	**8-10**	**7**	**4**
Caudal peduncle length	0.7-4.4	1.2	1.2
Caudal peduncle depth	0.4-2.1	0.8	0.8

Conclusion

This study documents skeletal deformities in fish and speculates on the cause of these deformities. The divergence from normality was determined through morphometrics and X-ray. It is evident that the specimen collected from Ormara showed a congenital reason of the disappearance of the spines and anal fin rays but in other specimen collected from Karachi Fish Harbour (KFH) indicated that the spines and fins were not congenitally disappeared but it could be due to injury as seen in other studies (Dulcic and Soldo, 2005).

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