



FIRST REPORT OF SINGLE PELVIC FIN IN *HEMIRAMPHUS FAR* (FAMILY: HEMIRAMPHIDAE) FROM INDIAN WATERS

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ABSTRACT

This is the first report of morphological abnormalities in *Hemiramphus far* (Forsskal, 1775) from Tamilnadu, S-E coast of India. A young female of 236mm SL, captured in a gill-net, was found with single pelvic fin. The comparison of morphological characters of normal specimens and abnormal specimen did not reveal any difference. Thus, it is concluded that stress during ontogenic growth affected the development of the second pelvic fin and this deficiency did not interfere in survival till adulthood.

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Received: 10/07/2019

Accepted: 05/01/2020

Keywords: Abnormality, *Hemiramphus far*, pelvic, morphological

INTRODUCTION

Unlike human, fishes are very sensitive to environmental stresses as they are poikilothermic. These stresses are expressed in several forms like behavioural pattern, disease, abnormality or deformity. The abnormalities have been reported in both teleost from Indian regions. Abnormalities have been reported in *Scoliodon laticaudus* (Carcharhinidae; Charcharhiniformes), *Dasyatis jenkinsi* (recently *Pateobatis jenkinsi* (Dasyatidae, Myliobatiformes), *Narke dipterygia* (Narkidae, Torpediniformes) from Port Novo by Devadoss (1983). Reports have been published on anomalies in the internal structure of the specimens with gonadal abnormalities in *Sardinella longiceps* (Bensam, 1964; Dhulkhed, 1965). Indian mackerel was also found to be morphologically deformed from Cochin (George *et al.*, 1959; Jones and Silas, 1962; Bapat and Radhakrishnan, 1966). Pillai (1967) recorded absence of upper caudal peduncle lobe and the anal fin. An anophthalmic condition, eye of abnormal specimen covered with

scale, was observed in *Sperata seenghala* (Bagridae; Suriformes) from Brahmaputra River, Assam (Barman *et al.*, 2016). Anophthalmic congenital, absence of one or both eyes in *Mystus tengara* was recorded from Assam (Barman *et al.*, 2014). *Terapon theraps* (Terapontidae, Perciformes), with anophthalmic condition was reported from Versova, Mumbai (Renjith *et al.*, 2018). In *Etroplus suratensis* (Cichlidae), a crescent shaped inundation, on the dorsal surface (Saddleback syndrome) was reported from Pranagipettai, Tamil Nadu, Coast of India (Jayaprabha *et al.*, 2016). Deformed and fused caudal region in *Epinephelus coioides* (Serranidae) was recorded from South east coast, India (Nagamuthu *et al.*, 2015). Deformed tail, hunch backed, long mandible, freak maxilla, short mandible was recorded in *Rastrilliger kanagurta* (Scombridae), from coastal waters of Cochin, India (Noble, 1971). Slight variations in the body proportions to total length from Karwar coast, Karnataka (Bapat & Radhakrishnan, 1966), and different sexes (gonad), hermaphroditism in one individual from

Kerala (CMFRI, 2017) was also reported. Thread like extension in the last ray of dorsal fin in *Thryssa malabaricus* and absence of pelvic fins in *Encrassicholina punctifer* (Clupeiformes; Engraulidae) was reported from Mumbai, India (Gangan et al., 2016). Similarly, a specimen of *Setipinna phasa* with accessory pectoral filament and *Setipinna taty* without pelvic fin, was recorded from east coast from India (Gangan et al. 2018). Gonadal abnormalities and certain changes in morphological characters were observed in *Sardinella longiceps* (Clupeidae; Clupeiformes) (Pillai, 1967) from Mandapam, Tamilnadu & absence of anal fin in *Esculosa thoracata* (Murugesan et al., 2018). Similarly, a specimen of *Bregmaceros mccllellandi* (Gadiformes; Bregmacerotidae) without left eye (anophthalmic condition), was reported from Versova, Mumbai (Nalwa et al., 2017). Deformed and fused caudal region in *Cynoglossus cynoglossus* (Pleuronectiformes; Cynoglossidae) from south east coast of India, was reported by Nagamuthu et al. (2015). During a taxonomic study on a Hemiraphiae (Beloniformes), an abnormality (only one pelvic fin) specimen of *Hemiramphus far* was collected from Devipattinam fish market, Tamil Nadu, India. Jose et al. (2020), reported absence of pelvic fins in three species of genus *Thryssa* from Indian waters. Further a reliable taxonomical work, observations of accuracy in morpho-meristic, is essential and the negligence may lead to misidentification or sometimes may result in report of a new species. Hence, it is always advisable to look the probabilities of abnormalities while studying taxonomy of fishes and describing new species, as Day (1878), misidentified malformed specimen of *Gymnura poecilura* as *Ceratoptera ehrenbergi*.

MATERIAL AND METHODS

During the present study, specimens of *Hemiramphus far* were collected from both east and west coast of India. Normal and abnormal specimen with anomaly, were collected from Devipattinam Fish market, Tamil Nadu, S-E coast of India. The specimens were brought to the laboratory in fresh condition, photographed and identified based on the key given by Collette (1984) and Collette (1999). The abnormal specimen has been preserved in 10% formalin and stored at the Departmental museum, ICAR-Central Institute of Fisheries Education, Mumbai, for future reference. Morphometric measurements (23) and meristic counts (7) were recorded according to Hubbs and Lagler (2004). The morphometric characters were scaled to % of HL and 16 of the morphometric characters were scaled to % of SL. The variables were analysed by using multivariate statistical analysis (MANOVA).

RESULTS

There was no sign or scar of injury or attack on the body of the abnormal specimen, with single pelvic fin (Sex-female; SL: 236 mm). A comparison of morpho-meristic characters of both normal and abnormal specimens was made (Fig. 1). Among the morphometric characters, the most significant was BL, HL and PAL, NPL. All the observed morphometric and meristic characters were found within the range of normal specimens (Table 1). Pelvic fin, rays for both normal & abnormal specimens were found to be exactly same i.e., 6. Similarly, other meristic characters of abnormal one were within the range of normal specimens. With these observations (morphological tools) the abnormal specimen was confirmed to be *Hemiramphus far*.

Table 1- Morphometric characteristics of normal and abnormal specimens

Ratio	Normal specimens (132.13-295.85mm)	Abnormal specimen (236mm)
Percentage in SL		
HL	15.88-19.68%	17.61%
PDL	48.57-65.76%	63.09%
PAL	56.80-71.72%	66.18%
PPVL	45.545-58.00%	52.80%
PPEL	16.89-21.94%	19.52%
DFBL	7.99-12.97%	10.58%
AFBL	4.97-7.90%	6.95%
PEBL	2.31-4.36%	3.29%
DFL	6.10-11.06%	9.16%
AFL	4.3-7.74%	5.49%
PEFL	9.41-14.37%	12.0%
BD	8.80-13.48%	12.17%
BW	4.90-8.30%	7.16%
DAD	7.99-12.61%	10.29%
CPL	4.23-8.63%	5.56%
CPW	3.98-6.06%	5.16%
Percentage in HL		
ED	23.00-28.47%	24.51%
SNL	29.11-38.19%	35.09%
BL	73.57-143.33%	130.28%
UPJL	12.76-21.55%	13.71%
IOD	22.51-36.62%	35.09%
IND	14.54-21.44%	20.78%
NPL	68.46-84.90%	83.42%
Meristic characters (numbers)		
Dorsal fin rays	8-13	12
Anal fin rays	9-12	11
Pectoral fin rays	9-11	10
Pelvic fin rays	6	6
Branchiostegal rays	9-16	13
Gillrakers	25-34	33
Predorsal scales	33-41	36



Fig.1- Normal specimen of *H. far*



Fig.2- Abnormal specimen of *H. far*

DISCUSSION

Hemiramphus far (Family: Hemiramphidae) is one of the minor pelagic marine species. Literature survey indicates that no such anomaly has been reported previously in this species. The absence of pelvic fin has been reported in *S. taty* from Indian waters (Gangan *et al.*, 2018), and the reasons cited for this type of abnormal specimen were anthropogenic disturbance, pollution (pollutant) and disturbance in early stages of development. Fin related anomaly is quite common in cultured as well as wild species. Several factors have been cited to be responsible for deformity. As fishes are very sensitive to environment, sudden changes in the surrounding environment affect them through their physiological mechanism like blood loss,

overcoming osmotic disturbances, infections, slow healing, avoidance of enemies or predators (Jawad, 2004), that inhibits their free-swimming movements (Sadler, 1990; Jawad, 2004), results in slow swimming and jerky movement (Hubb, 1919), hunger due to difficulty in taking food (Jawad, 2004). These aspects lead to inability to swim (Gunter and Ward, 1961) and finally, difficulty in survival to adulthood (Escobar-Sanchez, *et al.*, 2009). Some authors opined effect of physical and chemical factors (Jawad *et al.*, 2010), and biological factors in morphological deformities (Tutman *et al.*, 2000). The physical factors like temperature (Reynolds, 1993; Milton, 1971) light, DO (Turner and Farley, 1971), water surface tension (Setiadi & Tsumura, 2007), salinity, pH (Reynolds, 1993) are important in

causing deformity. While chemical factors such as pollution caused by heavy metals in water i.e., As, Cd, Hg, Pb, Zn (El-Samra *et al.*, 1986; Emara 1990, Proctor *et al.*, 1994; Sloof, 1982, Longwell *et al.*, 1992; Lien, 1997), in sediments (Ehrhardt & Burns, 1993; Al-Abdali *et al.*, 1996; Massoud *et al.*, 1996; Shriadah, 1999; De Mora *et al.*, 2004) have been blamed. The biological factors like hereditary defects (Schaperclaus, 1992), genetic changes during mutation (Subba, 2008), genome difference (Scheiner, 1993), teratogenic effect (Subba, 2008), damage in embryonic development (Schaperclaus, 1992; Heupel *et al.*, 1999; Uma and Waghray, 1989-90; Dutta *et al.*, 1993), injuries (Schaperclaus, 1992; Dutta and Kaur, 1994), diseases (Schaperclaus, 1992; Dublin 1979), parasite infections (Heupel *et al.*, 1999; Brown and Nunez, 1998), attack by the predator and nutritional deficiency (Heupel *et al.*, 1999), some consequence changes in reproduction during courtship or intraspecific competition (De Girolamo *et al.*, 1999; Koumoundouros, 2008), are underlined as causative factors. The mutagenic chemicals (Longwell *et al.*, 1992; Lien, 1997) affect both young and developing individuals (Brown and Nunez, 1998). Sometimes, anomaly may be a result of electrofishing (Gangan *et al.*, 2018) and electric stimuli (Patten, 1968). The fish shows response of the environmental disturbances in morphometric as well as meristic characters. Studies have shown the differences in meristic characters due to differences in time of their development (Lindsey, 1988; Sfakianakis *et al.*, 2011) and environmental differences (Fowler, 1970; Barlow, 1961). Sometimes fin deformity affects the meristic count in the abnormal specimen (Nair, 1973), which may create ambiguity in identification of that particular group of species (Gangan *et al.*, 2016), leading to description of new species.

Acknowledgements

Authors behold sincere gratitude to the Dr. Gopal Krishna, Director, and B.B. Nayak, Head FRHPHM Division, ICAR-Central Institute of Fisheries Education, Mumbai for encouragement

and Indian Council of Agricultural Research for providing financial support in the form of fellowship.

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