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First record on the absence of anal fin in the white sardine, *Escualosa thoracata* (Valenciennes, 1847) from Indian waters

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White sardine, *Escualosa thoracata* (Valenciennes, 1847) forms a minor fishery along the west coast of India. An abnormal specimen of white sardine, lacking anal fin, was collected from Mangalore coast along with the normal specimens. The characters of the abnormal specimen are described along with normal specimens. The report is the first of its kind for *E. thoracata* from Indian waters. The possible causes of the abnormality in this species have been discussed in this communication.

[**Keywords:** White sardine; Abnormality; Anal fin; Indian waters]

Introduction

The abnormality is a condition in which internal or external appearance changes from the normal morphology¹. Deformities and abnormalities in fishes have been well studied and reported, both in wild and cultured²⁻¹². The abnormalities may occur due to several causes such as environmental factors¹³, anthropogenic activities¹⁴, nutritional deficiency, mutation, inbreeding, disease, mechanic trauma, attack from predators and injury^{9,15}. These kinds of anomalies coupled with different ecological and environmental variables help in environmental assessments¹⁴.

Escualosa thoracata, commonly named as white sardine is a coastal pelagic schooling fish, mostly found along the western Indian coast, South East Asia and some parts of Oceania. It forms an important fishery on the West coast of India¹⁶ and a targeted fishery along the Mumbai coast¹⁷. It is reported that decrease in oil sardine catch increases the importance of white sardine¹⁸.

Few cases of abnormalities in clupeoid fishes have been reported in India. Baburao²² reported the absence of pelvic fins in *Thryssa malabarica* collected from Madras coast. Gangan²³ reported the dorsal fin abnormality in *Enchrasicholina punctifer* (Engraulidae) from Mumbai waters. A comprehensive survey of existing literature including Dawson^{19,20,21}

revealed only 3 incidences of absence of anal fin in clupeoid fishes around the world. The dorsal and anal fin and their supported deformities are rarely reported and required much needed attention²¹. This communication is the first report on the absence of anal fin in *E. thoracata* from Indian waters.

Materials and Methods

The specimens were collected and checked for morphometric characters during routine biological study. The abnormal specimen was noticed along with normal specimens from Mangalore coast during November 2016. Morphological comparison of abnormal specimen and normal specimens was documented by using Canon Powershot and X-ray radiograph (AGFA CR 30-X). The species was identified based on the existing literature^{16,25}. Morphometric and meristic counts were recorded for both, normal and abnormal specimens. The abnormal specimen has been stored at the Departmental museum, ICAR- Central Institute of Fisheries Education, Mumbai for further reference purpose.

Results

Morphological characters of the abnormal specimen were compared with normal specimens, collected from the same sampling location (Fig. 1). The abnormal specimen lacked anal fin, completely

Table 1 — Morphometric characteristics of normal and abnormal specimen

Morphometric traits	Abnormal Specimen (mm)	Normal Specimen (mm)	Abnormal Specimen (% of SL)	Normal Specimen (% of SL)
Standard length	72.52	75.63	-	-
Total length	97.07	96.5	133.85	127.59
Fork length	81.41	83.8	112.25	110.80
Head length	16.92	17.53	23.33	23.17
Inter orbital width	4.35	4.06	5.99	5.36
Pre orbital length	3.25	3.74	4.48	4.94
Post orbital length	8.4	8.14	11.58	10.76
Eye diameter	4.76	5.05	6.56	6.67
Pre dorsal length	36.4	37.26	50.19	49.26
Dorsal fin base length	10.05	9.89	13.85	13.07
Pre pelvic length	36.83	37.1	50.78	49.05
Pre pectoral length	17.51	17.48	24.14	23.11
Pre anal length	-	55.67	0	73.60
Anal fin base length	-	11.5	0	15.20
Caudal peduncle depth	8.07	8.65	11.12	11.43
Maximum body depth	22.53	23.74	31.06	31.38
Weight	7	7	-	-
Vertebral Number	21	21	-	-

Fig. 1 — Abnormal and Normal specimen of *E. thoracata*

and no sign or scar of injury or attack was observed. However, caudal peduncle depth was found to be smaller in the abnormal specimen (8.07 mm, 11.12% of standard length) while it was found to be about 8.9% of standard length in normal specimen. Similarly, the maximum body depth was also found to be smaller in case of the abnormal specimen (Table 1). In normal and abnormal specimens, dorsal fin rays were 14 and 15, respectively. Pelvic fin rays of both normal and abnormal specimens were found to be 6 but number of ventral scutes were found to be more in the abnormal specimen. The post-pelvic scutes were considerably larger in the abnormal specimen. Pterygiophores which forms the base of the dorsal and anal fin, was absent in the anal fin region of deformed fish (Fig. 2).



Fig. 2 — X-ray radiograph of Normal and abnormal fish specimens

Discussion

A few reports are available on the absence of anal fin in clupeids^{4,22,24}. Absence of anal fin and upper lobe of caudal fin and curvature in the region of caudal peduncle has been reported in *Sardinella longiceps* from Mandapam region⁴ while the absence of anal fin in *Nematalosa nasus* has been reported from Pakistan waters²⁴,²² observed lesser number of scutes in *Thryssa malabarica* which lacked anal fin but in the present study, the number of scutes in the abnormal specimen was found to be more. However, meristic counts of both, abnormal and normal specimens, were found to

be in range reported in the previous studies^{16,25}. Larger post-pelvic scutes in the abnormal specimen is similar to report of large post pelvic scutes in *Nematalosa nasus* which lacks anal fin as reported by Hussain²¹. However, despite the absence of the anal fin, the abnormal specimen resembles the normal specimen in all aspects and the absence of anal fin did not show much effect on the growth of the specimen.

Schäperclaus²⁶ described five major causes of fish deformities: hereditary factors, damage during embryonic development, injuries, diseases and damage due to environmental factors. Gangan²³, while reporting the abnormality in *E. punctifer* suggested that these kinds of abnormalities may be due to the exposure of fishes to pollutants during early developmental stages. Hussain²⁴ concluded that lack of anal fin in *N. nasus* in early ontogeny was associated with internal reorganisations. Walker and Taylor²⁷ reported the absence of anal fin in brook trout opined that since one specimen was found to be abnormal in a large sample, it may be possible due to mutation events. So, the record of abnormality in present study may also be due to the damage in development during the early ontogeny or mutation.

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