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Short Communication

Report of absence of pelvic fin in three species of genus *Thryssa* (Engarulidae, Clupeiformes) from India

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During the study on the taxonomy of Engarulidae, three abnormal specimens of genus *Thryssa viz. T. kammalensis* collected from Orissa, and *T. hamiltoni* and *T. dayi* collected from Mumbai were examined. The morphological traits of abnormal specimens were compared with the normal specimens collected from the respective sampling locations. All the three abnormal specimens were lacking pelvic fin. The report is first of its kind in these three species of *Thryssa*.

[**Keywords:** Abnormality, Engraulidae, India, Pelvic fin, *Thryssa*]

Introduction

Any change in the normal body structure, external or internal of the fish is considered as abnormality[1]. Deformities are known to be caused by various factors, including contaminants in the environment, lack of essential nutrients, deficiency of oxygen, temperature fluctuations, water current, mutation, inbreeding, parasitic infestation, mechanical trauma, and predator's attack[2-5].

Pelvic fins of teleost are paired appendages, located below and behind the pectoral fin, that are considered to be homologous with the hind limbs of tetrapods[6]. During swimming, the pelvic fins act as static trimming foils rather than dynamic moving structures[7,8]. A recent study has suggested that pelvic fins probably play a more complex role in swimming such as moving actively against imposed hydrodynamic loads, complex three-dimensional motion during slow-speed steady swimming and maneuvers, and produce powered correction forces during steady swimming and trim correction forces during manoeuvres[9].

The absence of the upper caudal lobe and complete absence of the anal fin were reported in *Sardinella longiceps* Valenciennes, 1847 (Clupeidae)[10] and absence of pelvic fins in *Thrissina balaema* (Forsskål, 1775) from Marine Bay, Port Blair, Andaman[11]. Baburao[12] reported the absence of pelvic fin in *T. malabarica* (Bloch 1795) from Madras coast. Gangan[13] reported abnormality of the dorsal fin in *Encrasicholina punctifer* Fowler, 1938 from Mumbai waters. Present communication is the first report of the absence of pelvic fins in the three species of genus *Thryssa,* Cuvier, 1829 i.e; *Thryssa kammalensis* Bleeker, 1849, *Thryssa hamiltoni* J. E. Gray, 1835 and *Thryssa dayi* Wangratana, 1983.

Materials and Methods

While sampling for the regular taxonomic study of family Engraulidae, one specimen each of the three species *of Thryssa; T. kammalensis, T. hamiltoni* and *T. dayi*, lacking pelvic fins, were collected along with the normal specimens. The abnormal specimen of *T. kammalensis* was collected from Orissa coast in August 2017 and that of *T. hamiltoni* and *T. dayi* from Mumbai coast in October 2017.

The morphometric and meristic characters were measured and counted, respectively, by following Whitehead[14]. A total of 26 morphometric variables and 7 meristic counts were measured from both normal and abnormal specimens. Characters of each abnormal specimen were compared with that of the normal specimens. The specimens were photographed using Canon Powershot SX-400. The abnormal specimens have been deposited at the Departmental museum, Central Institute of Fisheries Education, Mumbai, India.

Results

When morphological characters of the normal and abnormal specimens, collected from the same site, were compared; except for the absence of pelvic fin, both types of specimen were similar, and there was no sign of ulcerations and lesions on abnormal specimens (Figs. 1 A, B and C). In the normal specimen, the ventral fin originates just posterior to the longest ray of the pectoral fin. In all abnormal specimens, a slight gap was noticed, posterior to the pre-pelvic scutes, indicating the position of the pelvic fin.

In *T. kammalensis* pectoral fin base length and anal fin base length were found to be 32.83 % and 3.53 %

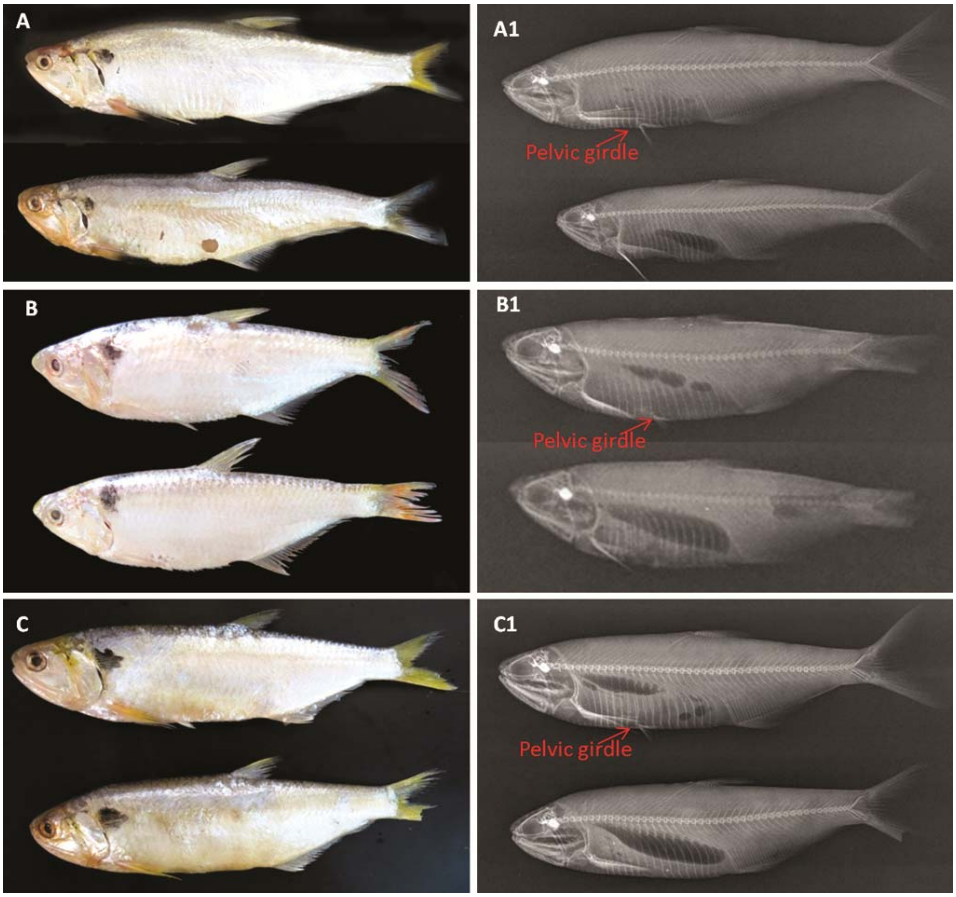

Figure 1 — A: normal and abnormal specimen of *Thryssa dayi*; A1: X-ray radiograph of normal and abnormal specimen of *Thryssa dayi*; B: normal and abnormal specimen of *Thyrssa kammalensis*; B1: X-ray radiograph of normal and abnormal specimen of *Thryssa kammalensis*; C: normal and abnormal specimen of *Thryssa* hamiltoni; and C1: X-ray radiograph of normal and abnormal specimen of *Thyrssa hamiltoni.*

of standard length, respectively, while these values were found to be lower than the normal specimens which were 30.88 % for pectoral fin base length and 2.73 % for anal fin base length while in the abnormal specimen of *T. kammalensis*, the tip of snout was slightly deformed when compared to the normal. In *T. hamiltoni*, the maximum body depth of abnormal specimen was found to be larger (28.25 % of the standard length) than the normal specimen (27.73 % of the standard length). The abnormal specimen of *T. dayi* showed an increased length of dorsal fin base (8.32 % of SL) and anal fin base (40.21 % of SL) than normal (7.94 % and 39.10 % of standard length, respectively). However, the meristic counts of all the three abnormal specimens were found to be in the range of normal[15]. No significant increase in the size of scutes were noticed, which was situated beyond the actual position of pelvic fin. The X-ray radiograph of all the three abnormal specimens showed the absence of pelvic girdle (Figs. 1 A1, B1 and C1).

Discussion

The absence of pelvic fins of the three species is rarely observed phenomenon in Engraulids. However, a similar specimen of *T. malabarica* without pelvic fin and less number of scutes was reported[12] but in the present study, number of scutes of the three abnormal specimens were found to be unaltered. Enlargement of scutes was reported in *Nematalosa nasus* (Boch, 1795) which lacked anal fin[15], but in the present specimens, there was no enlargement of pelvic scutes. Similarly, meristic counts of the abnormal specimens were found to be in the range of the normal specimens. Despite the absence of pelvic fins, all the other characters were similar to that of the normal ones, and it has not affected the normal growth of the fish.

Such abnormalities have been reported in other fishes also. Parimala[15] reported absence of pelvic fin in estuarine gizzard shad, *Nematalosa nasus*. Hore[16] reported a wild specimen of Indian Carp, *Cirrhinus*

mrigala (Hamilton, 1822) with multiple vertebral deformities. The absence of fins in yellow menhaden *Brevoortia smithi* Hildebrand, 1941 has been reported by Hettier[17]. Marr[18] noted missing pelvic fins in northern anchovy, *Engraulis mordax* Girad, 1854.

Many reasons have been suggested for these abnormalities. Walker and Taylor[19] suggested that the absence of anal fin in brook trout may be the result of mutation events. However, wide range of physical, chemical and biological factors may cause body anomalies of different species in natural and reared conditions[20]. The instances of abnormalities in fishes are very frequent nowadays, and this can be the result of increasing anthropogenic activities in the aquatic ecosystems. This may be the result of increasing the exposure to pollution during the early developmental stages[13]. In this current report also, the absence of pelvic fin may be due to any of the environmental stresses or mutation events in the early life stages.

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Conflict of interest

Authors declare that they do not have any conflict of interest.

Author contributions

First author has collected data and processed, and others authors have contributed in data processing, analysis and writing of manuscript.

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