First record of dorsal and anal fin deformities in silver pomfrets, *Pampus argenteus* (Stromateidae, Actinopterygii)

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Received: 10 December 2009
Accepted: 26 July 2010
Published on-line: 30 July 2010

Resumen

Primer registro de deformidades en las aletas dorsal y anal de la palometa plateada, Pampus argenteus *(Stromateidae, Actinopterygii)*

La información sobre deformación de la aleta caudal y sus causas es escasa. Además, aunque hay alguna información sobre deformación de los pterigóforos, no se había señalado la total ausencia de los mismos. En este estudio se hace una descripción de un caso de ausencia de pterigóforos de la aletas de palometa plateada, *Pampus argenteus (Euphrasen, 1788)* procedente de la costa omaní del Golfo Pérsico.

Palabras clave: Anormalidad, Pterigóforos, *Pampus argenteus*, Oman, Golfo Pérsico.

Abstract

The information on anal fin deformity is scanty and there is a paucity of knowledge regarding the causes behind such anomaly. Although, some information on the pterygiophore deformity in fish is available, nothing is known about the complete absence of those structures. In the present study, a description of the case of absence of the pterygiophores supporting the anal fin in silver pomfrets, *Pampus argenteus* (Euphrasen, 1788) collected from the Omani coasts of the Arabian Gulf is given.

Key words: Abnormality, Pterygiophores, *Pampus argenteus*, Oman, Arabian Gulf.

Introduction

Deformities in fish have deserved the attention of several investigators since the 16th century (Berra & Au 1981) and since then, a great number of studies document the appearance of various types of abnormalities in wild (Browder et al. 1993, Lemly 2002, Jawad 2005, Al-Jufaily et al. 2005, Boglione et al. 2006, Jawad & Hosie 2007, Jawad & Öktoner 2007, Jawad et al. 2007, Koumoundouros 2008). The development of the skeletal deformities occurs during the early life stages due to unfavorable environmental conditions (Sfakianakis et al. 2004, 2006) and pollutants (Bengtsson 1988, Lemly 1993), as well as due to inbreeding and mutations (Tave et al. 1983, Gjerde et al. 2005). Thus, skeletal anomalies have been considered as an important indicator of environmentally induced stress of fish in the wild (Bengtsson 1988, Lemly 1993, Boglione et al. 2006, Koumoundouros 2008).

The dorsal and anal fins and their support deformities in particular are scarcely reported and deserved less attention (Hussein 1979).The only skeletal deformity case in *Pampus argenteus* reported so far from the Arabian Gulf area by Al-

Hassan (1982). The abnormal specimen was obtained from a commercial catch at Sharjah fish market, U.A.E.

The present paper documents for the first time the absence of the pterygiophores supporting the dorsal and anal fins in wild-caught silver pomfrets *Pampus argenteus* (Euphrasen, 1788).

Two specimens without pterygiophores supporting the dorsal and anal fins were detected in a catch of commercial fishes collected in the area of Khasab, Omani coasts of the Arabian Gulf (Fig. 1) by a local fisherman. The total number of specimens of silver pomfrets in the catch is 48 and no fish specimen of other species has shown the fins deformity in question. The fishes were caught by long line net at water depth of 17-23m on 3rd February 2009. The anatomical description of the deformity was completed by comparative examination of X-ray of the deformed and of normal specimens. The deformed specimens are deposited in the fish collection of the Marine Science and Fisheries Centre, Ministry of Fisheries Wealth, Muscat, Oman.

The deformed silver pomfret was 185 and 182mm in total length and 12 and 15g in weight compared with the normal fish (183mm in total length). The deformed individuals were characterized externally by a substantial shorter profile at the dorsal and anal fins area and complete deformity of the dorsal and anal fin rays. Although body meristic and morphometric characters (except for pectoral fin length) were consistent with previous description of this species (Kuronuma & Abe 1986) analysis with X-ray revealed that entire pterygiophores supporting the dorsal and anal fin were lacking (Fig. 2). The lack of dorsal fin rays whether it is partial or complete is known as the "saddleback syndrome" (SBS) (Tave et al. 1983). This type of syndrome has been reported in various species living in natural conditions (Browder et al. 1993, Lemly 1993). No correlation has been observed between skeletal anomaly in question and the caudal fin rays as other authors reported it from a reared (Koumoundouros et al. 2001) and natural living fishes (Koumoundouros 2008). The abnormal specimens also show a longer and wider pectoral fin in comparable with the normal specimen (pectoral fin length 43mm, 23.5% in total length in normal specimen, 53 and 54mm, 28.6 and 29.7% in total length in abnormal specimens; pectoral fin base width 13mm in normal specimen, 19 and 18.5mm in abnormal specimen). Also the anterior and ventral edges of the pectoral and

Figura 1. Mapa que muestra el lugar de captura de los ejemplares de *Pampus argenteus*.

Figure 1. Map showing the collection site of the specimens of *Pampus argenteus*.

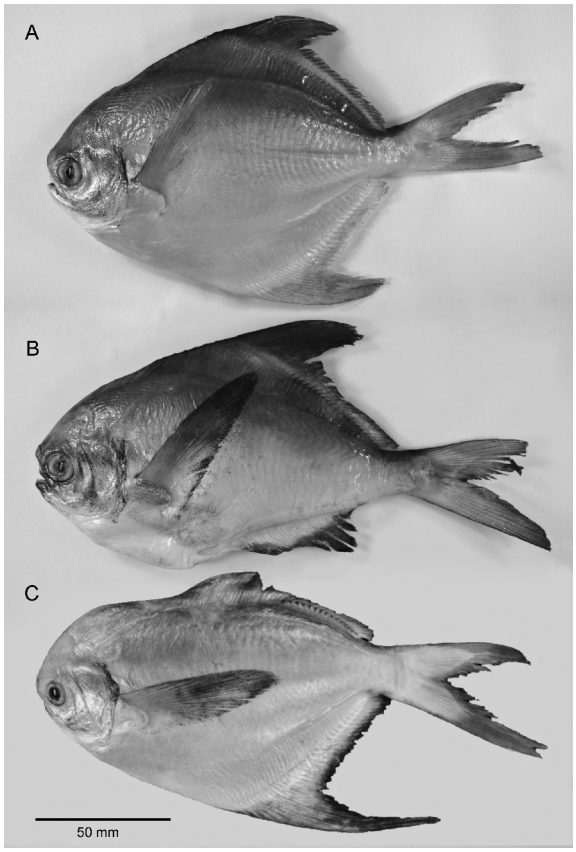

Figura 2. Morfología externa de palometas plateadas, *Pampus argenteus*. A: pez normal, B: pez con deformidad en la aleta ventral. C: pez con deformidad en la aleta dorsal.

Figure 2. External morphology of silver pomfrets, *Pampus argenteus*. A: normal fish. B: fish with ventral fin deformity. C: fish with dorsal fin deformity.

deformed dorsal and anal fins respectively are darker in the abnormal specimen than in the normal. In the specimen with ventral fin deformity, minor skeletal abnormalities were seen in the deformed specimen these are: the preural centrum (PU3) shown to have double neural spine, the neural spines of the 34th and 35th vertebrae are undulated, haemal spine of the 29th and 30th vertebrae is shorter than normal and not similar in length and the dorsal body edge is more or less emarginated. In the specimen with dorsal fin deformity, nineteen neural spines that present opposite the dorsal fin are completely deformed and short (Fig. 3). The absence of pterygiophores and the presence of complete fin rays intact might be a result of interference of external unfavorable conditions with the development of both pterygiophores and fin rays. The normal specimen presents the typical anal fin structure and support.

To our knowledge, such phenomenon for silver pomfrets and family Stromatidae was not observed, but the case of dorsal fin loss of pterygiophores was reported for the parrotfish, *Sparisoma cretense* (L., 1758) (Koumoundouros 2008). A lethal effect of severe skeletal deformities has been observed in fishes living under natural conditions by several authors (Matsuoka 1987, Boglione et al. 2001). Such deformity can hinder the movement of fishes and thus they became less capable to catch prey or avoid predator, but may not significantly affect fish survival (Koumoundouros 2008). It may, however, affect to a certain limit other aspects of performance such as reproduction success in species using fin display in courtship or intraspecific competition (De Girolamo et al. 1999, Koumoundouros 2008).

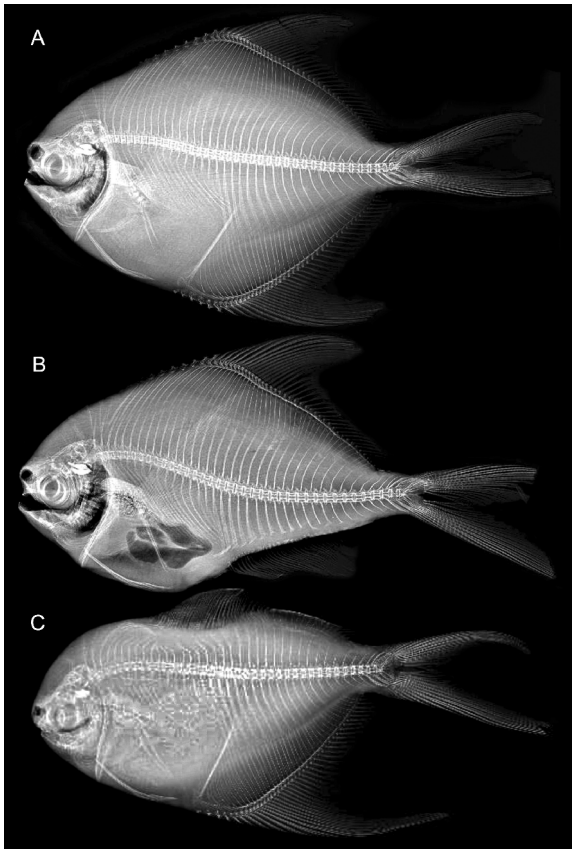

Figura 3. Radiografía de palometas plateadas, Pampus argenteus. A: pez normal, B: pez con deformidad en la aleta ventral. C: pez con deformidad en la aleta dorsal.
Figure 3. X-ray of silver pomfrets, *Pampus argenteus*. A: normal fish. B: fish with ventral fin deformity. C: fish with dorsal fin deformity.

The loss of pterygiophores from the dorsal and anal fins is an ontogenetic continuation of abnormalities of the primordial marginal finfold during the early larval stage (Koumoundouros et al. 2001).

A wide range of physical, chemical and biological factors may cause morphological deformities of fins in natural and reared conditions (Tutman et al. 2000). With the lack of data that correlate present case of dorsal and anal fin deformity with any of the above mentioned causative factors, it is too early to predict which ones of those factors are responsible for the abnormality in question.

In Strait of Hormuz, the nearby area to where the abnormal fishes were obtained, variation in the physical factors of the sea water such temperature, salinity, pH is characteristic of the area (Reynolds 1993). The juvenile stage of the stromatid specimen under investigation in this study could be exposed to such variation and thus producing the abnormality in question.

High levels of pollution by heavy metals and hydrocarbon are evident in the Arabian Gulf area from north to the south. In water (El-Samra et al. 1986, Emara 1990, Proctor et al. 1994), in sediments (Ehrhardt & Burns 1993, Al-Abdali et al. 1996, Massoud et al. 1996, Shriadah 1999, De Mora et al. 2004) and in fish and other marine organisms (Ehrhardt & Burns 1993, Al-Hassan et al. 2000, De Mora et al. 2004). Such high levels in pollutants could well affect the embryonic stage of the silver pomfrets specimens studied in the present work.

With no additional laboratory data that link the skeletal deformity at hand with the different biolo-

gical and genetical factors, it is too early to support such hypotheses.

Acknowledgement

We would also like to thank the Ministry of Fisheries Wealth and Agriculture and Fisheries Development Fund for giving us the opportunity to work on the fish samples within the qualitative and quantitative distribution of marine organisms in Sultanate of Oman and to provide the appropriate financial support. Our thanks should also goes to the Head of the X-ray Department and the technical team, Khaola Hospital, Muscat, for their assistant in taking X-ray and mammogram for the fish specimens. Also, we would like to thank Raymond Coory (Te Papa Tongarewa, Wellington, New Zealand) for the technical assistant in producing images.

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