

Malformation of the caudal fin in the freshwater mullet, *Liza abu* (Actinopterygii: Mugilidae) collected from Karkhe River, Iran

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Resumen

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Malformación en la aleta caudal del mujol de agua dulce, Liza abu (Actinopterygii: Mugilidae) capturado en el río Karkhe, Irán .

Se describe la malformación parcial de la cola de un ejemplar de *Liza abu* en Irán, incluyendo radiografías del mismo.

Palabras clave: *Liza abu*; Malformación; Radiografía; Irán.

Abstract

A malformation of caudal fin in *Liza abu* is described and X-ray images are included.

Key words: *Liza abu*; Malformation; X-ray image; Iran.

Introduction

Morphological deformities in fish in general, and skeletal abnormalities in particular, have been widely described and reviewed (Tutman et al. 2000, Jawad & Hosie 2007, Jawad & Öktoner 2007, Jawad et al. 2007). In wild fishes, the visible anomalies are usually encountered through fishing activities, angling, and scientific studies. They are used as indicators of water pollution, because of their high incidence in polluted areas (Bengtsson 1979). Fin anomalies in general are extremely well documented in both wild and reared fish, some of which (mainly in *Carassius* sp.) are used in ornamental aquaria (Divanach et al. 1996), on the other hand, caudal fin deformities have less appearance in the ichthyological publication. In aquaculture they involve absence of the tail, partial tail (single-lobed), double or triple tail or lobes (Tave et al. 1982, Bondari 1983, Dunham et al. 1991). In the wild, they involve absence of the tail (Honma & Noda 1987, Honma 1990, 1994) or compression (Lemly

1993). Partial tail incidence is very rare in wild fish populations (Divanach et al. 1996). *Liza abu* (Heckel, 1843) (Mugilidae) is a species that lives in freshwater in the Middle East area (Öktoner et al. 2006). In these areas, especially in Karkhe River and its branches (Iran), it has some local economical importance, mostly living and reproducing in the freshwater system during its whole life cycle. It is exposed to many physical and chemical variations, from temperature to pollution, in these most threatened ecosystems.

This study describes a case of partial tail in one specimen of the teleost fish *L. abu*. This is the first report of caudal fin anomaly in Iran and the second abnormal report about the species in Iran. Several skeletal anomalies, both severe and minor, were reported previously by Al-Hassan (1987) for *L. abu* collected from Karkhe River, south west of Iran.

Material and Methods

One specimen of *Liza abu* showing partial loss of



Figura 1. Mapa señalando el área de muestreo de *Liza abu*.
Figure 1. Map showing the sampling area of *Liza abu*.

the caudal fin (TL 127 mm, SL 106 mm, age 2⁺) was caught by cast net from waters of Karkhe River branches near Sūsangerd (South west of Iran) in August 2008 (Fig. 1). A normal specimen (TL 130mm, SL 119mm) was obtained from the same locality for comparison (Fig. 2). Age was determined using fish scales viewed under a light microscope. The specimen was radiographed with ordinary X-rays to interpret the skeletal anomaly.

Results

Caudal fin deformity was visible on the fish body immediately after capture, with the lower lobe missing, when compared with the normal specimen (Fig. 2). The following features were observed in the abnormal specimen (Figs. 3B & 3c): The fifth hypural bone, lower hypural plate and its attached caudal fin rays, parhypural bone and its attached ventral procurrent rays were absent. The haemal spine of the penultimate vertebra was distorted and directed ventrally instead of posteriorly. Minor anomalies such as undulation of the caudal fin rays and the haemal spine of the 2nd and 3rd caudal vertebrae were evident. With the absence of the 5th hypural bone, the usual two procurrent rays have no bony structure to attach to. Finally, the ribs of the 4th-10th thoracic vertebrae exhibited non-alignment.

In fishes, in general, the caudal fin has an important role in maneuvering and steering functions; therefore it must be constructed so as to

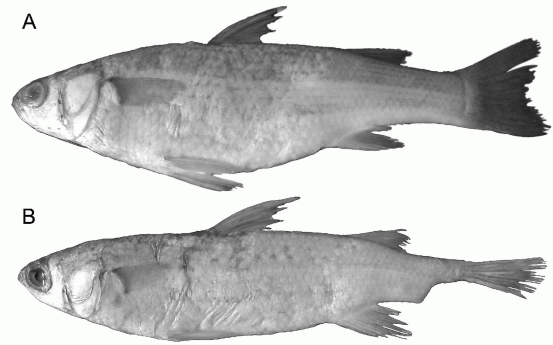


Figura 2. **a:** Especimen normal de *Liza abu* (LT 130mm, LE 119mm). **b:** Especimen anormal (LT 127mm, LE 119mm).
Figure 2. **a:** Normal fish specimen of *Liza abu* (TL 130mm, SL 119mm). **b:** Abnormal fish specimen (TL 127mm, SL 106mm).

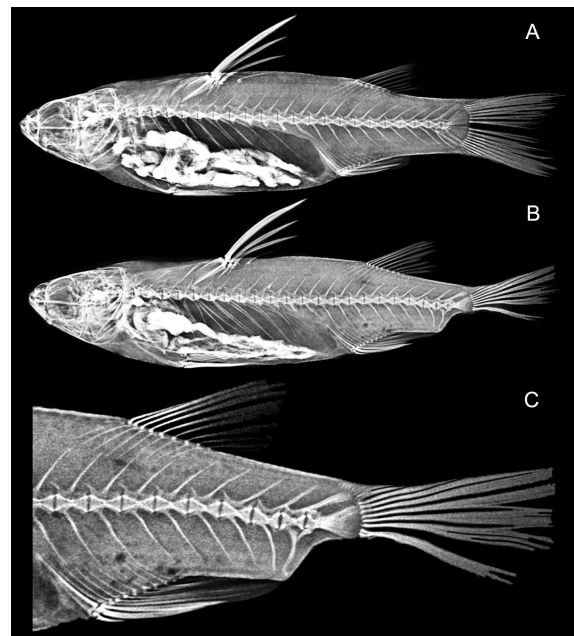


Figura 3. **a:** Radiografía de la columna vertebral del espécimen normal de *Liza abu*. **b:** Radiografía del espécimen con aleta anormal. **c:** Ampliación de la aleta anormal.
Figure 3. **a:** X-ray image for the vertebral column of the normal specimen of *Liza abu*. **b:** X-ray image for the abnormal caudal skeleton. **c:** Enlargement of the abnormal caudal fin.

cope with hydrodynamic stresses with the least possible expenditure of energy (Bogliione et al. 1993). Any anomaly in the caudal fin will impair the flexibility of the tail, so hindering the performance of the fish (including the capacity to get food and to avoid predators). Among the xenobiotic substances, heavy metals such as Cd, Pb, Zn and Cu are suspected to cause reduction or absence of fins (Sloof 1982). On the other hand, evidence is emerging of a malformation effect of photo and thermo-period induction of reproduc-

tion where, in some fish species, these factors might cause complete or partial absence of the caudal complex (including caudal vertebrae) (Koo and Johnston 1978). Vitamin C deficiency has been associated with caudal fin degeneration (Halver 1972). Biotic factors such as expected attack during the juvenile stage from aquatic organisms such as piscivorous fishes or large crustaceans can not be eliminated (Dulčić and Soldo 2005). Similar cases concerning fin absence, partial abnormal absence and incomplete formation in general were recorded for the pelvic, ventral and dorsal fins in various fishes (Marr 1945, Nelson 1971, Álvarez-León 1980, Valente, 1988).

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