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Short communication

SADDLEBACK SYNDROME IN WILD SILVER POMFRET, *Pampus argenteus* (EUPHRASEN, 1788) (FAMILY: STROMATIDAE) FROM THE ARABIAN GULF COASTS OF OMAN

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Summary

The saddleback syndrome is recorded for the second time in a wild fish population of the Arabian Sea coasts of Oman. The deformed specimens of *Pampus argenteus* present a typical saddleback phenotype of missing dorsal fin pterygiophores. The possible causative agents of the saddleback syndrome in fishes are discussed.

Key words: fin abnormality, saddleback syndrome, causes, Arabian Gulf, Oman

INTRODUCTION

Great number of publications have documented the appearance of various cases of abnormalities in both wild (Browder et al., 1993; Lemly, 1993; Jawad, 2005; Al-Jufaily et al., 2005; Boglione et al., 2006; Jawad and Hosie, 2007; Jawad and Öktoner, 2007; Jawad et al., 2007; Koumoundouros, 2008; Al-Mamry et al., 2010) and aquaculture populations (Koumoundouros et al., 2001; Sfakianakis et al., 2004, 2006).

There are not many reports on fish dorsal fin abnormalities (Hussain, 1979). Among such anomalies of the dorsal fin is the 'saddleback syndrome' which is considered as a partial or complete lack of the dorsal fin (Koumoundouros, 2008). The skeletal abnormalities in the silver pomfret, *Pampus argenteus* living in the Arabian Gulf area were firstly reported by Al-Hassan (1982).

This study reports for the second time on the presence of the 'saddleback syndrome' in the wild-caught silver pomfret.

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MATERIAL AND METHODS

Two specimens with deformed dorsal fin were obtained by fishermen from a commercial catch in the Khasab area, Omani coasts of the Arabian Gulf (Fig 1).

Fig 1. Map showing the sampling area of Pampus argenteus

Slika 1. Karta područja uzorkovanja Pampus argenteus

The commercial catch of fishes obtained from Khasab area at the Omani coasts of the Arabian Gulf consisted of 17 specimens out of which only two specimens showed dorsal fin deformity. The total number of specimens of silver pomfret in the catch was 148 and no fish specimen of other species has shown the fin deformity in question. Long line fishing method at the depth of 15-20 m was used in the catch of January 23, 2011. The deformed silver pomfret was 180 and 182 mm in total length and 14 and 17 g in weight compared with the normal fish (182 mm in total length). Internal and external examinations were performed on the abnormal and normal specimens. For internal structure examination, a mammogram X-ray facility available at Khawla Hospital, Muscat was used. On the other hand, the external morphology was recorded using a large magnifier fitted with light. The deformed specimens are deposited in the fish collection of the Marine Science and Fisheries Centre, Ministry of Agriculture and Fisheries Wealth, Muscat, Oman.

RESULTS AND DISCUSSION

The deformed silver pomfret specimens were 180 and 184 mm in total length and 11 and 16 g in weight compared with the normal fish (183 mm in total length) (Fig 2a). Significant shorter profile is the characteristic of the dorsal fin of both abnormal specimens (Fig 2a, b). One of the deformed specimens (Fig 2b) showed complete dorsal fin deformity, while the other specimen showed dorsal fin deformity in the anterior part of the fin only (Fig 2c).

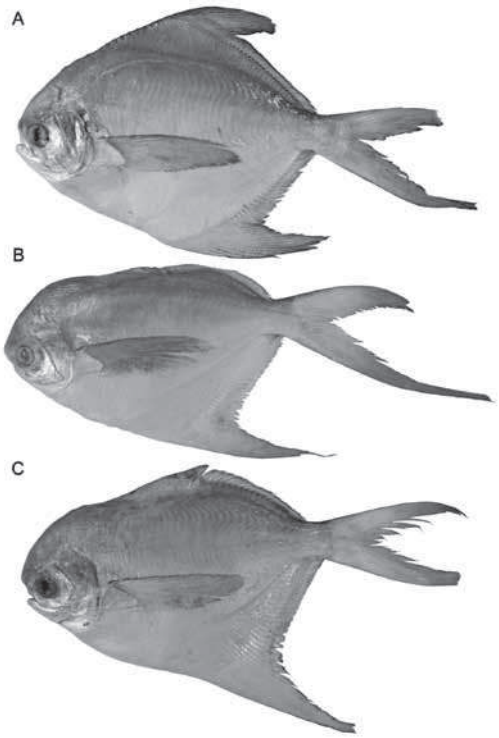

Fig 2. External morphology of silver pomfret, Pampus argenteus*. A: normal fish. B: fish with severe dorsal fin deformity. C: fish with mild dorsal fin deformity*

Slika 2. Vanjska morfologija srebrne plotice, Pampus argenteus*. A: normalna riba. B: riba s izrazitom deformacijom leđne peraje. C: riba s blagom deformacijom peraje*

Body meristic and morphometric characters showed consistency with the previous description of this species given by Kuronuma and Abe (1986), but X-ray analysis revealed that the entire dorsal fin rays of both specimens are deformed and the pterygiophores supporting the dorsal fin were lacking. In addition, and with a comparison to a normal specimen (Fig 3a), the neural spines of all thoracic and the first 2-3 caudal vertebrae are shown to have severe deformation as they are short, undulated and bent either forward or backward (Fig 3b, c).

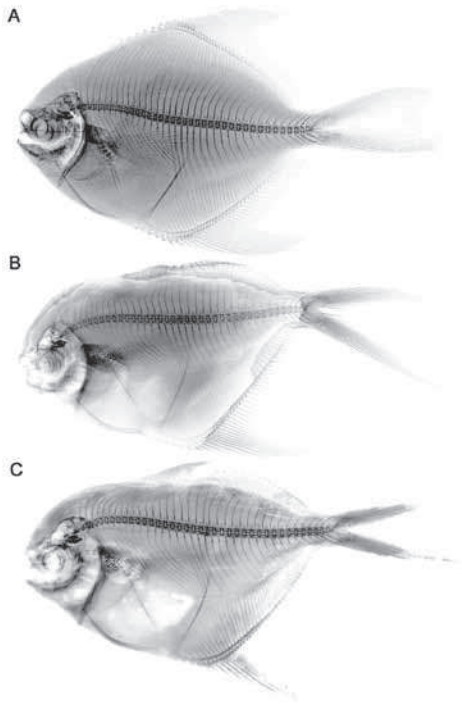

Figure 3. X-ray of silver pomfret, Pampus argenteus*. A: normal fish. B: fish with severe dorsal fin deformity. C: fish with mild dorsal fin deformity*

Slika 3. Rendgenska snimka srebrne plotice, Pampus argenteus*. A: normalna riba. B: riba s izrazitom deformacijom leđne peraje. C: riba s blagom deformacijom peraje*

The "saddleback syndrome" case obtained in the present study is more severe than that of Koumoundouros (2008) reported for wild parrotfish *Sparisoma cretense* (L., 1758). In the present case, the pterygiophores are absent and the neural spines are highly deformed while there are few pterygiophores and neural spines are not much deformed in Koumoundouros (2008) specimen. As far as the dorsal fin and its rays, the present case is more severe than that reported by Al-Mamry et al, (2010) where dorsal fin and its rays showed a slight deformation. The deformation of the neural spines of the thoracic and caudal vertebrae of Al-Mamry et al, (2010) specimen and the two specimens obtained in the present are in the same level of deformity. As to the Kuwaiti specimen (Al-Matar and Weizhong, 2010) and since no x-ray image was provided, it is possible to judge the severity of the case on the external morphology of the specimen. The Kuwaiti specimen thus has deformity level similar to the case of one of the present study specimens (Fig 1b).

No correlation has been observed between skeletal anomaly in question and the caudal fin rays as other authors reported it from reared (Koumoundouros et al., 2001) and fish living in their natural environment (Koumoundouros, 2008).

Tutman et al. (2000) related wide range of physical, chemical and biological factors to the abnormalities that interfere with the ontogenetic process of the dorsal fin. As the present study aimed to report the case at this stage, further studies are needed to correlate present case of dorsal fin deformity with any of the above mentioned causative factors, therefore it is too early to predict which one of those factors are responsible for the abnormality in question.

The Strait of Hormuz, where the abnormal fishes were obtained, is characterized with variation in physical factors of the sea water such as temperature, salinity, pH (Reynolds, 1993). It is very well for the juvenile stage of the stromatid specimens under investigation in this study to get exposed to such variation and thus producing the abnormality in question. On the other hand, the Arabian Gulf area from the north to the south is well known for high levels of pollution by heavy metals and hydrocarbon: in water (El-Samra et al.,1986; Emara, 1990; Proctor et al., 1994), in sediments (Ehrhardt and 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 and Burns, 1993; Al-Hassan et al., 2000; De Mora et al., 2004). Such pollutants could well affect the embryonic stage of silver pomfret studied in the present work.

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Sažetak

DEFORMACIJA LEĐNE PERAJE KOD SREBRNE PLOTICE, *Pampus argenteus* (EUPHRASEN, 1788) (PORODICA: STROMATIDAE) NA OMANSKOJ OBALI ARAPSKOG ZALJEVA

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Sindrom deformacije leđne peraje zabilježen je drugi puta kod divljih ribljih populacija na omanskoj obali Arapskog mora. Deformirane jedinke *Pampus argenteus* predstavl-

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jaju tipični fenotip kod kojeg nedostaje perajna potpora u leđnoj peraji. Polemizira se o mogućim uzročnicima tog sindroma kod riba.

Ključne riječi: abnormalnost peraje, deformacija leđne peraje, Arapski zaljev, Oman

REFERENCES

Al-Abdali, F., Massoud, M.S., Al-Ghadban, A.N. (1996): Bottom sediments of the Arabin Gulf-III. Trace metal contents as indicators of pollution and implications for the effect and fate of the Kuwait oil slick. Environnental Pollution, 93, 285-301.

Al-Hassan, J.M., Afzal, M., Rao, C.V.N., Fayad, S. (2000): Petroleum hydrocarbon pollution in sharks in the Arabian Gulf. Bull. Environ. Contamination Toxicology, 65, 391-398.

Al-Hassan, L.A. (1982): Vertebral abnormalities in fishes from Iraq and UAE, Arabian Gulf. Iraqi Journal of Marine Science, 1, 13-23.

Al-Jufaily, S.M., Jawad, L.A., Azri, A.N. (2005): Wild Siamese twins in black tip sea catfish, Arius dussumieri (Valencienes, 1840) from Gulf of Oman. Annals du Biologia, 27, 223-225.

Al-Mamry, J.M., Jawad, L.A., Al-Rasady, I.H., Al-Habsi, S.H. (2010): First record of dorsal and anal fin deformities in silver pomfret, *Pampus argenteus* (Stromatidae, Actinopterygiidae). Annals du Biologia*,* 32, 73-77.

Al-Matar, S., Weizhong , C. (2010): Deformities in silver pomfret *Pampus argenteus* caught from Kuwait waters. Chinese Journal of Oceanology and Limnology, 28, 1227-1229.

Boglione, C., Costa, C., Giganti, M., Cecchetti, M., Di Dato, P., Scardi, M., Cataudella, S. (2006): Biological monitoring of wild thicklip grey mullet (*Chelon labrosus*), golden grey mullet (*Liza aurata*), thinlip mullet (*Liza ramada*) and fathead mullet (*Mugil cephalus*) (Pisces: Mugilidae) from different Adriatic sites: meristic counts and skeletal anomalies. Ecology, 6, 712-732.

Browder, J.A., McClellan, D. B., Harper, D.E., Kandrashoff, W. (1993): A major developmental defect observed in several Biscayne Bay, Florida, species. Environmental Biology of Fishes, 37, 181-188.

De Mora, S., Fowler, S.W., Wyse, E., Azemard, S. (2004): Distribution of heavy metals in marine bivalves, fish and coastal sediments in the Gulf and Gulf of Oman*.* Marine Pollution Bulletin, 49, 410-424.

Ehrhardt, M.G., Burns, K.A. (1993): Hydrocarbons and related photo-oxidation products in Saudi Arabian Gulf coastal waters and hydrocarbons in underlying sediments and bioindicator bivalve. Marine Pollution Bulletin 27, 187-197.

El-Samra, M.I., Emara, H.I., Shumbo, F. (1986): Dissolved petroleum hydrocarbon in the northwestern Arabian Gulf. Marine Pollution Bulletin 17, 65-68.

Emara, S. (1990): Oil pollution in the southern Arabian Gulf and Gulf of Oman. Marine Pollution Bulletin, 21, 399-401.

Hussain, S.M. (1979): Record of a clupeoid fish *Nematalosa nasus* without an anal fin. Hydrobiologia, 63, 185-18.

Jawad, L.A. (2005): Scale deformities in Nile Tilapia, Oreochromis niloticus (Actinopterygii: Cichlidae) from Sudan. Acta Ichthyologica et Piscatoria, 35, 61-63.

Jawad, L. A., Hosie, A. (2007): On the record of pug-headedness in snapper, *Pagrus auratus* (Forster, 1801) (Perciformes, Sparidae from New Zealand. Acta Adriatica, 48, 205-210.

Jawad, L. A., Öktoner, A. (2007): Incidence of lordosis in the freshwater mullet, Liza abu (Heckel, 1843) collected from Atatürk Dam Lake, Turkey. Annals du Biologia, 29, 105-113.

Jawad, L. A., Ahyong, T., Hosie, A. (2007): Malformation of the lateral line and ambicolouration in the triplefin *Grahamina capito* (Jenyns, 1842) (Pisces: Tripterygiidae) from New Zealand. Annals de Museo Civico Storia natural de Ferrara, 9/10, 89-97.

Koumoundouros, G. (2008): First record of saddleback syndrome in wild parrotfish Sparisoma cretense (L.,1758) (Perciformes, Scaridae). Journal of Fish Biology, 72, 737-741.

Koumoundouros, G., Divanach, P., Kentouri, M. (2001): The effect of rearing conditions on development of saddleback syndrome and caudal fin deformities in Denttex dentex (L.). Aquaculture, 200, 285-304.

Kuronuma, K., Abe, Y. (1986): Fishes of the Arabian Gulf. Kuwait Institute for Scientific Research, Kuwait, 356-pp.

Lemly, A.D. (1993): Teratogenic effects of selenium in natural populations of freshwater fish. Ecotoxicology and Environmental Safety, 26, 181-204.

Massoud, M.S., Al-Abdali, F., Al-Ghdban, A.N., Sarawi, M. (1996): Bottom sediments of the Arabian Gulf-II. TPH and TOC contents as indicators of oil pollution and implications for the effect and fate of the Kuwait oil Slick. Environmental Pollution, 93, 271-284.

Proctor, R., Flather, R.A., Elliot, A.J. (1994): Modeling tides and surface drift in the Arabian Gulf-Application to the Gulf oil spill. Continental Shelf Research, 14, 531-545.

Reynolds, R.M. (1993): Physical oceanography of the Gulf, Strait of Hormuz, and the Gulf of Oman-results from the Mt Mitchell expedition *Marine Pollution Bulletin*., 27, 35-59.

Sfakianankis, D.G., Georgakopoulou, E., Papadakis, I., Divanach, P., Kentouri, M., Koumoundouros, G. (2006): Environmental determinants of haemal lordosis in European sea bass, Dicentrarchus labrux (Linnaeus, 1758). Aquaculture, 254, 54-64.

Sfakianakis, D.G., Koumoundouros, G., Divanach, P., Kentouri, M. (2004): Osteological development of the vertebral column and of the fins in *Pagellus erythrinus* (L.

1758). Temperasture effect on the development plasticity and morphoanatomical abnormalities. Aquaculture, 232, 407-424.

Shriadah, M.M.A. (1999): Heavy metals in mangrove sediments of the United Arab Emirates shoreline (Arabian Gulf). Water, Air & Soil Pollution, 116, 523-534.

Tutman, P., Glamuzina, B., Skaramuca, B., Kožul, V., Glavić, N., Lučić, D. (2000): Incidence of spinal deformities in natural populations of sandsmelt, *Atherina boyeri* (Risso, 1810) in the Neretva River Estuary, middle Adriatic. Fishery Research, 45, 61-64.

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