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First record of leucism in the long whiskers catfish *Mystus gulio* (Hamilton 1822) (Siluriformes: Bagridae)

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Abstract

In this communication, we report the first occurrence of leucism in a species of Bagridae: *Mystus gulio* (Hamilton 1822) from the Indian Sundarbans. Herein, we discuss the probable causes of the occurrence of the specimen with leucism.

Keywords: Abnormal pigmentation, brackish, fishing pressure, Ramsar site.

1. Introduction

Leucism is a relatively recent concept to be adopted in the field of ichthyology^[1]. Leucism or partial albinism is a genetically bounded peculiarity. It manifests as the total or partial loss of integumentary pigmentation while retaining the pigmentation of the retinas^[2].

Workers have documented albinism in several species of freshwater and saltwater catfishes from India (e.g., Hora as cited in Dawson^[3]; Gupta and Bhowmik as cited in Dawson^[3]; Rajapandian and Sundaram as cited in Rengarajan^[4]; James *et al.* as cited in Rengarajan^[4],^[5-8]). However, in catfishes of the genus *Mystus* Scopoli 1777, only a single record of albinism exists in the scientific literature as *Mystus pelusius* (Solander 1794), an unregistered specimen at Zoological Survey of India collected from the Tigris River in Baghdad, Iraq^[9]. No report of pigmentation anomaly in *Mystus* sp. exists from India.

On 21 February 2014, the first author bought a leucistic individual of *Mystus gulio* (Fig. 1) from a wet market in Pakhiralay, Sundarbans, a Ramsar site located in the South 24 Paraganas district of the eastern state of West Bengal, India. We have provided a brief description of the specimen and tried to ascertain the reasons behind its abnormal pigmentation.

2. Materials and Methods

The specimen was fixed in 15% formalin and then preserved in 70% ethanol. It was deposited in the Bharati Vidyapeeth Institute of Environment Education and Research Fish Collection (BVIEER/FC). Examined morphological and meristical characters follow Talwar and Jhingran^[10]. All bilateral counts and measurements are from the left side of its body.

3. Results

The description is based on BVIEER/FC 024, 93.2 mm in standard length (SL). The following measurements are expressed as a percentage of SL: Body depth 25.3; head length (HL) 26.3, head width 18.6; pre-dorsal length 41; post-dorsal length 50.6; caudal peduncle length 26.2. The following measurements are expressed as a percentage of HL: Eye diameter 17.9; interorbital width 37.5; snout length 33.8.

Dorsal fin rays I, 7; anal fin rays III, 10; pectoral fin rays I, 7; pelvic fin rays I, 5; gill rakers on upper limb of first gill arch 7, lower limb 29. The inner edge of the pectoral fin spine with nine serrations, outer edge smooth. Dorsal fin spine inner edge with slight abrasions and outer edge smooth. The occipital process not reaching basal bone of the dorsal fin. Four pairs of barbels including a pair of nasal barbels.



Fig 1: Photograph of the leucistic specimen of *Mystus gulio* from Pakhiralay, Sundarbans in West Bengal, India (Priyankar Chakraborty).

The body and the head possess white colour while the fins are pinkish-red in colouration. The occipital process and snout are pink. Eyes retain the original colour, black. There is an absence of melanophores in any part of the body.

4. Discussion

Hamilton^[11] described *M. gulio* (as *Pimelodus gulio*) from the estuaries of the river Ganges. *Mystus gulio* (Hamilton 1822) is a broadly distributed species and one of the few *Mystus* sp. known to occur in tidal waters and even the seas^[12].

The non-aberrant colouration of *M. gulio* (Fig. 2) consists of dark silvery-grey colour on the dorsum and upper portion of the flanks. It gradually turns white on the lower sides going into the ventral region. The fins have black markings on them. The present specimen displays a leucistic phenotype. We believe that the red colouration of the fins could be the result of mishandling of the fish. Originally the fins were white in colouration like the rest of the body.



Fig 2: Photograph showing the non-aberrant colouration of *Mystus gulio* (Shubhajit Kundu).

Leucistic animals are rare in the wild because of their easy detection by predators due to their conspicuous colouration. Aside from that, researchers have also observed behavioural impairment with conspecifics in aberrant coloured animals, for example, albino-biased ostracism in European catfish, *Silurus glanis*^[13].

The causes of leucism can be a multitude of factors. It can result from a random genetic alteration^[14]. Researchers have even found links between leucism (in birds) and anthropogenic factors^[15]. Similarly, in fishes, contamination from heavy metals can result in pigment anomaly^[16]. Furthermore, leucism could be due to genetic alteration as a result of a small population size that favours inbreeding^[17],

that could be the consequence of excessive fishing pressure. Though widely distributed, *M. gulio* is mostly aquacultured in freshwater ponds in the Indian Sundarbans, and are rare to come across in the wild (M. Mukherjee, personal communication, July 25, 2020). The reason for their rareness in the wild is not known. The local who was selling the fish said to the first author that he caught the leucistic individual in his 'Ghoni', a fish trap, from a brackish water inlet of the Bidyadhari River in Pakhiralay. It is not a reared fish. He also mentioned that differently pigmented individuals usually don't sell in the markets because buyers think that the colour variation is a result of some disease in the animal. So, fishers generally leave them out, if they find them while sorting their catch.

There were no paddies near the collection site, which leads us to believe that localized contamination of the water by pesticides (containing heavy metals or other pollutants) is not a possibility. We hypothesize that this individual's aberrant colouration is likely the result of a random mutation. But since we cannot rule out other anthropogenic factors (e.g., excessive fishing pressure), they require further investigation.

5. Conclusion

The present example of a colour anomaly in *Mystus gulio* (Hamilton 1822) presents a leucistic phenotype of the species. Reports of aberrant colouration in fishes and other taxa contribute to our understanding of skin colour abnormalities in different populations and species.

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