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First Record of Partial Xanthism in Bronze Featherback *Notopterus synurus* (Osteoglossiformes: Notopteridae)

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ABSTRACT

We report the first occurrence of partial xanthism in *Notopterus synurus* (Bloch and Schneider 1801), collected from West Bengal, India, in May 2018. The specimen has yellow colouration on the dorsal portion, head and fins, except for a white ventral region, melanophores on the pectoral fin base and black eyes.

Key words : *Aberrant colouration, Notopterid, Pigmentation, Wetland, Xanthochromism*

Introduction

Xanthism or xanthochromism is usually caused by a mutation that suppresses melanophores and allows the expression of xanthophores, which gives an individual organism a yellow to golden orange pigmentation (Lewand *et al.,* 2013). Among freshwater fishes, xanthism is commonly reported in the Cyprinidae family (Kobayasi, 1957; Pawar and Jawad, 2017; Yablokov *et al.,* 2020), but reports of xanthic individuals from other families exist as for example, Cyprinodontidae (Turner and Liu, 1977) and Cichlidae (Webber *et al.,* 1973). However, no unusual colouration has been reported in featherbacks of the genus *Notopterus* Lacepède 1800. The genus is restricted to fresh and brackish water habitats in Pakistan, India, Nepal, Bangladesh, Myanmar, Thailand, Laos, Indonesia and Malaysia (Froese and Pauly [eds.], 2021). It used to comprise a single species, *N. notopterus* having a large distribution. However, recent molecular studies have shown that two allopatric species reside within its range, *N. synurus* (Bloch and Schneider 1801), endemic to the Indus and Ganges/Brahmaputra river systems and *N. notopterus* (Pallas 1769), found in the rest of Southeast Asia (Lavouè *et al.,* 2020). Herein, we report the first case of partial xanthochromism in a wild notopterid, *N. synurus*, from India.

Materials and Methods

On 25 May 2018, a partially xanthic specimen of *N. synurus* was caught with a hand net from a wetland (22°25′29.3″N, 88°23′25.5″E) in the southern outskirts of Kolkata, West Bengal, India. The sampling location contained floating and submerged aquatic vegetation, about 25 cm water depth, the temperature was 26.3 °C, and the pH was 6.5. We fixed the specimen in 10% formalin, following which we preserved it in 99% alcohol and deposited the specimen at Bharati Vidyapeeth Institute of Environment Education and Research (BVIEER), Pune, India. The individual was identified, according to Talwar and Jhingran (1991). All bilateral counts were made on

the left side of the individual under a stereomicroscope.

Results and Discussion

Description

Dorsal fin rays-I/7; pectoral fin rays-16; ventral fin ray-6; anal fin and caudal fin rays-103. Scales minute, cycloid; lateral line straight with 222 scales. Total gill rakers-13. Body oblong and greatly compressed; dorsal profile more concave than ventral profile; body depth 3.8 times in total length (TL). Head length (HL) 4.6 times in TL. Snout length 21 times in TL; 4.4 times in HL. Eye diameter 16.6 times in TL; 3.6 times in HL. Pectoral fin extends beyond anal fin origin; anal and caudal fin united, base long; 1.3 times in TL. Coloration golden yellow dorsally, whitish ventrally. The dorsal, anal and caudal fins yellow, melanophores on the base of pectoral fins and eyes black (Fig. 1a).

Remarks

Xanthism is a rare form of aberrant colouration (Yablokov *et al.,* 2020). In the food fish market, xanthic fish has fewer chances of being sold due to their departure from normal colouration, which is sometimes ascribed to diseases (Chakraborty and Yardi, 2020). These could be reasons why they are seldom encountered and also reported less. Typically, the colouration of *N. synurus* is silvery-white with numerous fine spots on the head and body (darker on the dorsum) and golden eyes (Fig. 1b). The partially xanthic *N. synurus* shows only one area of the body (base of the pectoral fins) that retains melanophores. The reason could be that mutations of xanthophore genes have not taken place in all the body regions, allowing some parts of the body to retain their melanistic pigmentation (Watanabe and Kondo, 2015).

Fig. 1. (a) *Notopterus synurus,* a partially xanthic specimen, BVIEER/FC031, 127.21 mm TL, Shyamkhola, West Bengal, India. (b) *N. synurus* typical specimen, not registered, southern West Bengal (Photos by Andrew Arunava Rao).

The cause of this condition could be the result of wounds from being predated upon (Colman, 1972), genetic expression, neuroendocrine disorders (Jawad *et al.,* 2013), dietary deficiency of vitamin C and E (Simon *et al.,* 2011) and an increase in the temperature of the water during the larval phase (Aritaki and Sekai, 2004). We found no deviation in morphological characters in the collected specimen and typical coloured specimens.

We believe that this uniquely coloured fish results from a gene expression and not predation. Dietary deficiency seems highly unlikely as there were other individuals collected with the specimen, showing normal colouration. Therefore, the present individual of partially xanthic *N. synurus* extends our understanding of the colour variations of the family Notopteridae.

Material Examined

BVIEER/FC 031, 1 specimen, 127.21 mm in TL, 7.3 g in total wet weight, 22°25′29.3″N, 88°23′25.5″E, Shyamkhola, Narendrapur, Dakshin (South) 24 Paraganas, West Bengal, India, 25 May 2018, hand net, collected by Andrew Arunava Rao.

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Conflict of interest

The authors declare no conflict of interest.

References

Aritaki, M. and Seikai, T. 2004. Temperature effects on early development and occurrence of metamorphosis-related morphological abnormalities in hatchery-reared brown sole *Pseudopleuronectes herzensteini. Aquaculture.* 240 (1-4) : 517-530. https://doi.org/

10.1016/j.aquaculture.2004.06.033

Chakraborty, P. and Yardi, K. 2020. First record of leucism in the long whiskers catfish *Mystus gulio* (Hamilton 1822) (Siluriformes: Bagridae). *International Journal of Fisheries and Aquatic Studies.* 8 (5) : 226-228. https://doi.org/10.22271/fish.2020.v8.i5c.2328

Colman, J.A. 1972. Abnormal pigmentation in the sand flounder (note). *New Zealand Journal of Marine and freshwater Research.* 6 (1-2): 208-213. https://doi.org/10.1080/00288330.1977.9515419

Froese, R. and Pauly, D. (eds.). 2021. FishBase. World Wide Web electronic publication. www.fishbase.org, version [electronic version, Accessed 13 May 2021].

Jawad, L.A.J., Al-Shogebai, S. and Al-Mamry, J.M. 2013. A reported case of malpigmentation in the spangled emperor *Lethrinus nebulosus* (Osteichthyes: Lethrinidae) collected from the Arabian Sea coasts of Oman. *Thalassia Salentina.* 35: 29-35. https://doi.org/10.1285/ i15910725v35p29

Kobayasi, H. 1957. On the colour variations of the mud loach, *Misgurnus anguillicaudatus* (Cantor). *Journal of the Faculty of Science, Hokkaido University Series VI, Zoology.* 13 (1-4): 63-66.

Lavoué, S., Ghazali, S.Z., Jamaluddin, J.A.F., Nor, S.A.M. and Zain, K.M. 2020. Genetic evidence for the recognition of two allopatric species of Asian bronze featherback *Notopterus* (Teleostei, Osteoglossomorpha, Notopteridae). *Zoosystematics and Evolution*. 96 (2): 449-454. https://doi.org/10.3897/zse.96.51350

Lewand, K.O., Hyde, J.R., Buonaccorsi, V.P. and Lea, R.N. 2013. Orange coloration in a black-and-yellow rockfish (*Sebastes chrysomelas*) from central California. *California Fish and Game.* 99 (4): 237-239.

Pawar, R.T. and Jawad, L.A. 2017. First Report of a Xanthic Phenotype of the Silver Carp, *Hypothalamichthyes molitrix* (Valenciennes, 1844) (Teleostei: Cyprinidae) from Maharashtra Fish Seed Production Centre, India. *International Journal of Aquaculture*. 7 (15): 101-105. https://doi.org/10.5376/ija.2017.07.0015

Simon, T., Joyeux, J.C. and Gasparini, J.L. 2011. Are melanic coney *Cephalopholis fulva* getting common? *Marine Biodiversity Records.* 4: e51. https://doi.org/10.1017/S1755267211000455

Talwar, P.K. and Jhingran, A.G. 1991. *Inland fishes of India and adjacent countries. Vol. 1.* A.A. Balkema, Rotterdam.

Turner, B.J. and Liu, R.K. 1977. Xanthic variants in a natural population of the Salt Creek Pupfish, *Cyprinodon salinus. The Southwestern Naturalist.* 22 (4): 538-540. https://doi.org/10.2307/3670156

Watanabe, M. and Kondo, S. 2015. Is pigment patterning in fish skin determined by the Turing mechanism? *Trends in Genetics*. 31 (2): 88-96. https://doi.org/10.1016/j.tig.2014.11.005

Webber, R., Barlow, G.W. and Brush, A.H. 1973. Pigments of a color polymorphism in a cichlid fish. *Comparative Biochemistry and Physiology Part B: Comparative Biochemistry.* 44 (4): 1127-1135. https://doi.org/10.1016/0305-0491(73)90265-4

Yablokov, N.O., Klunduk, A.V. and Forina, Y.Y. 2020. First Report of Xanthic Phenotype of the Common Bream *Abramis brama* (Linnaeus, 1758) from Krasnoyarsk Reservoir, Russian Federation. *Asian Fisheries Science*. 33 : 366-369. https://doi.org/10.33997/j.afs.2020.33.4.008