

絶滅危惧種「ネコギギ」における白化形質の遺伝様式に関する最初の報告

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Short Paper

First Record of the Inheritance Pattern of Leucism in the Bagrid Catfish *Pseudobagrus ichikawai*, an Endangered Species

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Abstract: This is the first report of the inheritance pattern of leucism in *Pseudobagrus ichikawai*, an endangered species inhabiting the Toyo River. A leucistic male fish of this species, which was caught in June 2007, had a pale yellow body and blackish eyes. Two male-female pairs of normal individuals were also caught from the same area where the leucistic individual was caught. Leucistic and normal juveniles were obtained by mating these pairs. In these juveniles, the segregation ratio for the leucistic to normal phenotype was approximately 1 : 3. This result suggests that the leucism trait shows an autosomal recessive pattern of inheritance in *P. ichikawai*.

Key words: Bagrid catfish; Leucism; Inheritance; Toyo River

The bagrid catfish *Pseudobagrus ichikawai* inhabits only rivers that flow into Ise Bay and Mikawa Bay, Central Honshu, Japan (Watanabe 1994). Recently, the populations of this species have drastically decreased because of artificial damage to the habitat, and this species has therefore been designated as endangered (category IB) in the Red Data Book of Japan (Ministry of the Environment 2003). The Toyo River, one of the rivers that flow into Mikawa Bay, runs through Shitara, Shinshiro, Toyokawa, and Toyohashi in Aichi Prefecture. The bagrid catfish is found in the upper reaches of the Toyo River. In June 2007, as a part of the bagrid catfish preservation program conducted by the Shitara Dam Construction Office, a leucistic male individual with a pale yellow body and blackish eyes was caught from this river (Fig. 1a). A normal male fish that was caught at the

same time had a muddy yellow body and dark brown spots tinged with purple on 4 areas of the body (between the head and gill cover, on the lower side of the dorsal and adipose fins, and on the basal area of the caudal fin; Fig. 1b) (as shown in Miyadi et al. 1976).

Since 2006, we have been trying to spawn bagrid catfish under artificial conditions as a part of the bagrid catfish preservation program. Through this program, we obtained some information regarding the inheritance pattern of leucism. In July 2007, we mated a normal female individual (total length, 110 mm; body weight, 21.0 g; individual identification number, 5C-female) with a normal male individual (total length, 105 mm; body weight, 16.5 g; individual identification number, 5C-male). Hereafter, we will refer to this mating as 5C-female × 5C-male. In July 2008, we mated a normal female individual (total length, 107 mm; body weight, 15.6 g; individual identification number, 2C-female) with a normal male individual (total length, 127 mm; body weight, 23.0 g; individual identification number, 10C-male). Hereafter, we will refer to this mating as 2C-female × 10C-male. In June 2007, both these pairs were caught for the purpose of reproduction from the same area the abovementioned leucistic individual had been caught. The fish were individually reared in 30-l tanks and fed frozen bloodworms (Clean Akamushi, Kyorin Industry Co.) until they mated. In 2007, the 5C-female fish spawned 1,423 eggs. From these eggs, 112 normal and 45 leucistic juveniles were obtained. In 2008, the 2C-female fish spawned 798 eggs. From these eggs, 205 normal and 69 leucistic juveniles were obtained. Both the observed phenotypes suggested that the leucism trait in bagrid catfish has an autosomal recessive pattern of Mendelian inheritance (χ^2 test, no significant differences at the 5% level against the expected normal to leucistic phenotypic ratio of 3:1). This pattern is similar to that seen in the inheritance of albinism in medaka, *Oryzias latipes* (Yamamoto 1969); goldfish, *Carassius auratus* (Yamamoto 1973); the red-spotted masu trout *Oncorhynchus masou ishikawae* (Yamamoto et al. 1999); and the bitterling *Tanakia signifer* (Ueda et al. 2007). In this study, the 7-month-old leucistic juveniles (produced by 2C-female × 10C-male) had a light yellow body, faint

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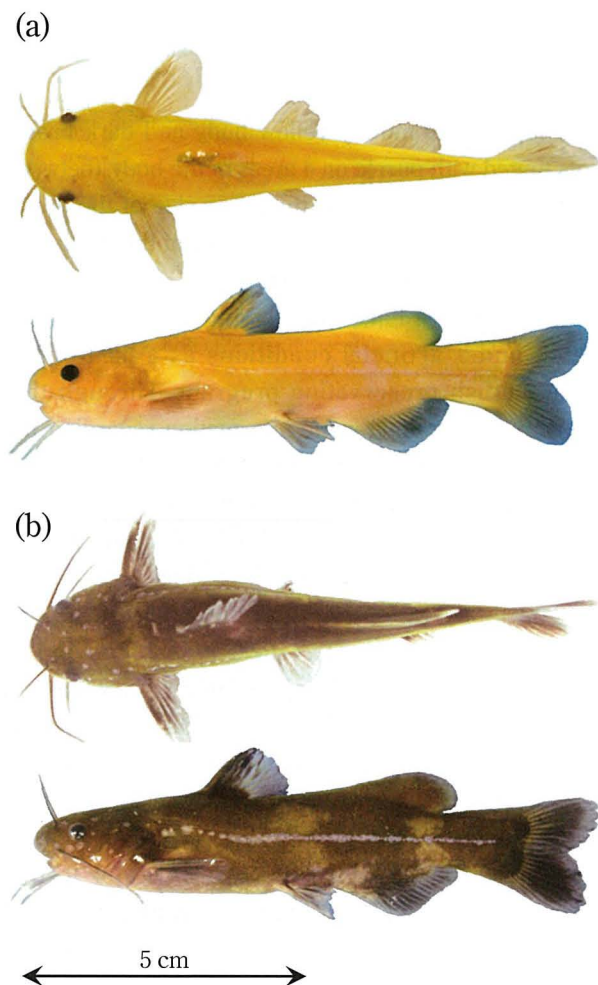


Fig. 1. Two *Pseudobagrus ichikawai* individuals caught from the Toyo River in June 2007. (a) Leucistic male fish with a pale yellow body and blackish eyes. (b) Normal male fish with a muddy yellow body and dark brown spots tinged with purple on 4 areas of the body (between the head and gill cover, on the lower side of the dorsal and adipose fins, and on the basal area of the caudal fin). Both the upper figures show the dorsal profile and the lower figures, the lateral profile. The arrow represents 5 cm.

light brown spots on the 4 abovementioned areas of the body, and blackish eyes (Fig. 2a). The 7-month-old normal juveniles (produced by 2C-female \times 10C-male) had the same body-color pattern as the normal adults (Fig. 2b). At 14 months of age, the leucistic juveniles (produced by 5C-female \times 5C-male) still had a light yellow body with faint light brown spots on the 4 abovementioned areas (Fig. 2c). In the 19-month-old leucistic juveniles (produced by 5C-female \times 5C-male; Fig. 2d), the faint light brown spots had begun to merge with and become indistinguishable from the light yellow body, which now appeared similar to that of the leucistic adult captured in 2007. We suspect that the faint light brown spots associated with leucism lighten with age.

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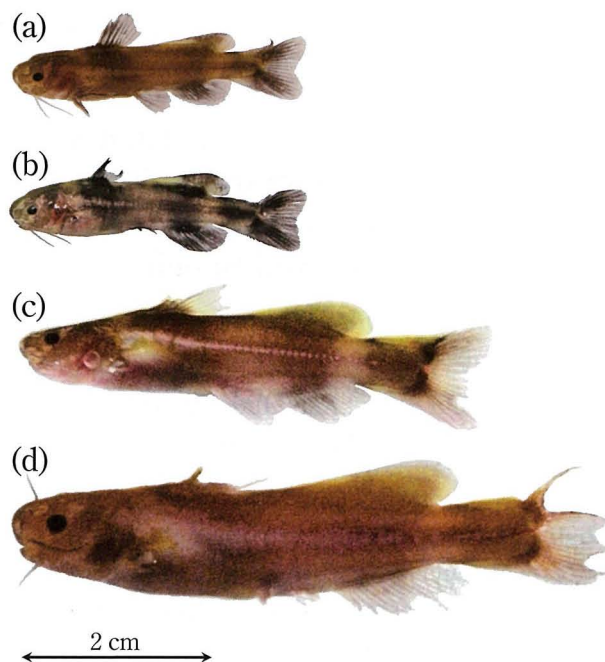


Fig. 2. *Pseudobagrus ichikawai* juveniles produced by normal parents. (a) A 7-month-old leucistic juvenile produced by 2C-female \times 10C-male. (b) A 7-month-old normal juvenile produced by 2C-female \times 10C-male. (c) A 14-month-old leucistic juvenile produced by 5C-female \times 5C-male. (d) A 19-month-old leucistic juvenile produced by 5C-female \times 5C-male. These individuals lacked a part of the pectoral fin, the caudal fin, the anal fin, and the dorsal fin because they were attacked by other individuals. The arrow represents 2 cm.

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