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Letter to the editor Open Access

A case report of a white François Langur in the Guangxi Encheng National Nature Reserve, China

INTRODUCTION

The pelage color of mammals has crucial functions of concealment, inter- and intraspecific communication, and the physiological regulation of solar absorption (Caro, 2005; Guan et al., 2024; Lai et al., 2025; Shang, 2014; Sun, 2006). Concealment can allow individuals to reduce predation risk and, in some cases, increase their ability to ambush prey (Caro, 2005; Singh & Mohnot , 2009). In forests , mammals have usually been selected for dark coat colors to cope with their surrounding through natural selection, However, white individuals which contrast highly with other group members, have still been documented in many primate species. These cases include *Aotus* spp. (Aquino & Encarnación, 1986); *Alouatta caraya* (Borges & Tomás, 2004); *Alouatta guariba*,(Sánchez-Sarmiento et al., 2017); *Callicebus olallae* (Pessôa et al., 2014); *Callithrix flaviceps* (Cheiro et al. 2010); *Chlorocebus pygerythrus*(Turner et al., 2020); *Semnopithecus entellus* (Kumar et al., 2011); *Macaca mulatta*(Singh & Mohnot, 2009); *Gorilla gorilla* (Prado-Martinez et al., 2013); *Pan troglodytes* (Gonder et al., 2011) , though further information on these occurrences is often limited.

The François langur (*Trachypithecus francoisi)*, a critically endangered Old World monkey species with a polygynous society, typically exhibits black pelage with white stripes hair from corners of mouth to the ears on both cheeks (Huang et al., 2018a; Mittermeier et al., 2013; Roos et al., 2011; Zhou et al., 2013). A white female individual was discovered in 2018 in the Guangxi Encheng Nature Reserve, China, presents a striking contrast to her group (Figure 1; Figure 2; Huang et al., 2018b). This case provides a valuable opportunity to investigate the type of coat color variation through an evaluation of her hair , skin and eyes , her breeding ability , and her behavioral strategies compared to normal members in the group, as well as the underlying genetic variation if follicle samples from both white female and black individuals become available.

Understanding this case will provide valuable insights into coat color variation, social tolerance and behavioral flexibility in François langurs, as well as the broader ecological and evolutionary implications of hypomelanism in wild primate populations.

STUDY SITE AND METHOD

Encheng National Nature Reserve (ENNR) is located in Daxin County, Guangxi Province, China, (N22°36′32"–N22°49′53" / E106°58′12"–E107°15′45"), covering a total area of 25,819 ha. Situated near the southern border of China and Vietnam, the reserve is an important passage for biological exchange between mainland Asia and the Indochinese Peninsula and lies within one of the world's biodiversity hotspots (Myers et al., 2000). We observed the langurs during their daily range using binoculars (Sky Hawk Pro 14×42) and photographed them with a Nikon AF-S 800mm lens. We also conducted interview with reserve patrols to obtain breeding information of white langur. All research was carried out with formal permission from the ENNR Administration Bureau and adhered to the legal requirements of China and the ethical guidelines for the treatment of non-human primates set by the International Primatological Society.

RESULTS IS

The white female was estimated to be three years old when first observed in late 2018: her hair body hair hast transitioned from completely white to little slightly blackish hue, and the skin on her ears and face has developed minor blackish pigmentation, while her fingers and nails remain white-pink. Interestingly, her eyes have remained black throughout (Figure 2). As of 2024, she has successfully reared three offspring, all exhibiting normal black pelage (Table 1).

Another white individual (infant) was discovered in 2019 within a neighboring group approximately 5 kilometers away according to staff of ENNR.

Furthermore, an investigation in the available historical record revealed that a white Francois langur was first documented in the reserve in the 1970s1980s. According to personal communications with local villagers, sightings of white individuals of the species were also reported as early as the 1950s.

DISCUSSION

White coat color variation results from a lack of melanin pigmentation and exhibits in the skin, hair and eyes. However the underlying reasons are complex, involving several key genes such as KIT, MITF and EDNRB, and disruptions across the entire pigmentation pathway (Lucati & López- Baucells, 2017; Pavan & Sturm, 2019). According to the degree of variation, it is classified into albinism, leucisim, piebalism and

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Figure 1 White female and her family member on karst cliff by Tang, L.Z

bypomlanism (Lucati & López-Baucells, 2017). For completed white coat individual, the eye color is the key indicator to discriminate albinism from leucism, with red eye belonging to albinism and black classified into leucism. Research indicated that albinism results from recessive gene with high heritability and lower fertility, whereas leucisim can be caused by both recessive and dominant genes and is typically linked with normal fertility (Cieslak et al., 2011; Lucati & López-Baucells, 2017; Oetting & King, 1999; Pavan & Sturm, 2019). Based on these criteria, the white female François' langur, which has black eyes, is identified as exhibiting leucism rather than albinism. This diagnosis is further supported by her successful reproductive history. The fact that she has produced three normally pigmented color offspring demonstrates her breeding success and indirectly confirms that her genetic variation is compatible with a normal fertility, consistent with the profile of leucism.

The infant pelage color of colobines is usually different from that of adults which shows a light yellow to golden yellow hue (Mittermeier et al., 2013; Roos et al., 2011). The offspring of the white female Francois langur followed this principle. It remains difficult to determine if this color variation is in any way influenced by the mother's leucism.

In contrast to the black members, the white female is highly conspicuous in the forest. While this has facilitated group location during our study, preliminary behavioral observations indicate that the leucistic female shows a preference for concealed positions, such as under the canopy, during group movement. This suggests a behavioral strategy that may differ from normally pigmented individuals, potentially as an adaptation to her higher conspicuousness (unpublished data). The specific genetic mutation in the pigmentation pathway responsible for this leuicism remains currently unknown. We continue to attempt the collection of biological samples for genetic analysis in future research.

COMPETING INTERESTS

All authors declare they have no conflict of interest.

AUTHORS' CONTRIBUTIONS

C.H. designed original research and wrote the first manuscript. P.H., E.A. and Z.Z. revised the English and provided valuable comments, Q.Z. reviewed and approved the article. All authors read and approved the final version of the manuscript.

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Figure 2 The colors of hair, skin and eyes of white female francois langur by Zhao, J.X..

Table 1 Three offsprings of white female francois langur

Offsprings of little white	Time of birth	Phenotype	Sex	Resource
No 1	Early 2020	Black	unknown	observer
No 2	July 2023	Black	unknown	patroller
No 3	Late 2024	Black	unknown	patroller

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