

A case of albinism in rhesus macaque *Macaca mulatta* from Tundah Wildlife Sanctuary, Himachal Pradesh, India

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Abstract

A case of albinism in a rhesus macaque (*Macaca mulatta*) is documented from Tundah Wildlife Sanctuary, Himachal Pradesh, India, in December 2025, where a white-colored infant was observed within a troop of conspecifics. This represents the second documented case of albinism in wild rhesus macaques from India and the first from the Western Himalayan region. This observation adds to the limited documentation of chromatic abnormalities in Indian primates.

key words: Albinism; maternal care; social tolerance; primates; Western Himalaya

1. Introduction

Chromatic abnormalities, including albinism and leucism, have been reported in various animal groups (Borteiro et al., 2021; Barros-Diaz et al., 2022; Leroux et al., 2022; Srijan et al., 2025). These conditions result from genetic mutations affecting melanin synthesis and deposition, leading to partial or complete loss of pigmentation. Albinism, controlled by multiple genes, is characterized by the complete or near-complete absence of melanin in hair, skin, and eyes, and is inherited as an autosomal recessive trait (Wu et al., 2020). In contrast, leucism involves partial or complete loss of pigmentation while eyes retain normal coloration, controlled by six genes affecting pigment cell differentiation and migration (García-Morales et al., 2012; Reissmann & Ludwig, 2013; Barros-Diaz et al., 2022).

Within primates, chromatic abnormalities have been documented in toque macaques (*Macaca sinica*), bonnet macaques (*Macaca radiata*), western lowland gorillas (*Gorilla gorilla gorilla*), black-handed spider monkeys (*Ateles geoffroyi*), and chimpanzees (*Pan troglodytes*) (Fooden, 1979; Mahabal et al., 2012; Prado-Martinez et al., 2013; Espinal et al., 2016; Leroux et al., 2022). In rhesus macaques specifically, recent molecular investigations have identified

spontaneous oculocutaneous albinism (OCA) cases characterized by mutations in the *TYR* and *OCA2* genes (Wu et al., 2020). The other documented case of albinism in wild rhesus macaques from India was recently reported from Barak Valley, Assam, where an albino infant received protective maternal care within its natal group (Sonar et al., 2025).

These chromatic abnormalities are typically associated with small, isolated, or inbreeding populations (Bensch et al., 2000; Barros-Diaz et al., 2022). The expression of such conditions serves as an important warning signal for population genetic health, reduced genetic diversity, and potential long-term viability concerns. While albinism is considered extremely rare in wild populations, individuals who survive typically exhibit reduced visual acuity, increased susceptibility to ultraviolet radiation, and compromised predation avoidance, resulting in lower fitness and survival rates (Leroux et al., 2022). However, the social acceptance and maternal care of albino individuals within primate groups can vary considerably, with documented cases ranging from complete acceptance to infanticide (Leroux et al., 2022; Sonar et al., 2025).

In this context, the present study documents a case of albinism in a wild population of rhesus macaque from Himachal Pradesh, India, thereby extending the known geographic occurrence of this rare chromatic abnormality and contributing to the growing body of literature on pigmentation anomalies in Indian wildlife.

2. Materials and methods

The albino individual was incidentally observed in Tundah Wildlife Sanctuary, Chamba district, Himachal Pradesh, India ($32^{\circ}30'50''$ N, $76^{\circ}27'38''$ E; 2,349 m asl) during routine patrolling and was monitored over the subsequent three days, with behavioral observations focusing on social association and foraging activities. Photographic documentation was carried out from a distance of approximately 25–30 m using a Canon 80D camera equipped with a 100–400mm sigma telephoto lens to minimize disturbance. Geographic coordinates were recorded using a handheld GPS unit, photographs were processed for clarity using Adobe Photoshop 2022, and a location map was generated using QGIS (fig. 1).

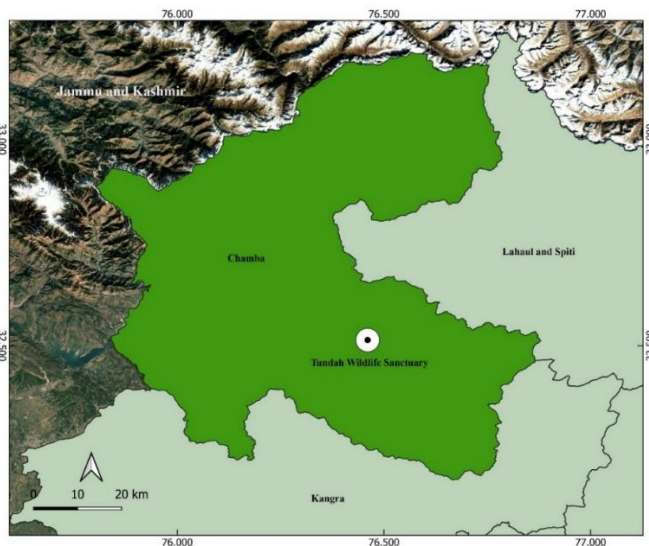


Figure 1. Map of Chamba district, Himachal Pradesh, India, showing the location of Tundah Wildlife Sanctuary where an albino *Macaca mulatta* was recorded.

3. Results & Discussion

An infant albino rhesus macaque (*M. mulatta*) was documented on 7 December 2025 in Tundah Wildlife Sanctuary (Fig. 2). The individual exhibited complete depigmentation of the hair and skin, displaying a white coloration throughout the body. The albino infant presented the characteristic phenotype of complete albinism, with white or pale coloration of the fur and skin, and was clearly distinguishable from all other group members, which displayed the typical brown coloration of wild rhesus macaques. The eyes appeared atypical in coloration and morphology; however, no ophthalmological examination was possible under field conditions.

During the observation period, the albino infant remained in close spatial association with its mother, indicating active maternal protection and care. The infant remained mobile within the troop and engaged in typical infant activities such as riding on the mother's back, feeding on wild fig fruits, foraging alongside troop members, climbing on *Pinus* spp. trees, and resting/basking on exposed rocks (Fig. 2b–f). Other group members were frequently observed in close proximity without any apparent aggression or avoidance behavior.

In contrast to the infanticide documented in wild chimpanzees with albinism (Leroux et al., 2022), the Tundah albino macaque received continuous maternal care and protection. This observation is consistent with the case reported from Assam by Sonar et al. (2025), where the albino infant similarly remained associated with its mother and was tolerated within the natal group. Thus, the acceptance and care provided by the mother suggest that albinism does not necessarily result in rejection or aggression from group members in rhesus macaques, at least during the infant stage.

This macaque troop occupying the Tundah Wildlife Sanctuary landscape demonstrated typical rhesus macaque behavioral patterns. The troop utilized the study area as a nocturnal sleeping site and moved through the forest during daytime hours in search of food resources. The estimated troop size of 65–70 individuals is similar with documented group sizes for rhesus macaques in Himalayan regions (Singh et al., 2016).

The presence of an albino individual in the Tundah population may suggest the possible circulation of recessive albinism alleles within this macaque troop. Similar to observations in other primates, the expression of albinism in small or isolated populations is often attributed to increased homozygosity resulting from limited gene flow or inbreeding (Bensch et al., 2000). The rhesus macaque population in Himachal Pradesh, while broadly distributed, exists in fragmented habitats with potential population substructuring. Therefore, the appearance of chromatic abnormalities may serve as an indicator of genetic status within local populations, particularly in areas experiencing habitat fragmentation or population isolation.

This report documents the second case of albinism in wild rhesus macaques in India, following the recent documentation by Sonar et al. (2025) from Assam, and thereby expands the known geographic distribution of this condition within the species' range in India.



Figure 2. Albino infant *Macaca mulatta* recorded in Tundah Wildlife Sanctuary, Himachal Pradesh, India: (a) albino infant with its mother, (b) riding on the mother's back, (c) feeding behavior, (d) foraging in association with troop members, (e) climbing on *Pinus* tree, and (f) resting/basking on rock.

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Conflict of interest

The authors declare that they have no competing interests.

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