

A rare case of brown plumage aberration in the Himalayan vulture (*Gyps himalayensis*) from Haryana, India

Zriedkavý prípad hnedej aberácie operenia supa snežného (*Gyps himalayensis*) v Harijáne, India

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Abstract: Plumage aberrations in wild birds are well-documented, although underreported in large raptors, especially in high-altitude species such as the Himalayan vulture (*Gyps himalayensis*). Here, we report a rare case of brown plumage mutation observed in a juvenile Himalayan vulture in Haryana, India. The morphological characteristics are consistent with known descriptions of brown eumelanin-based aberrations, providing valuable insight into pigment anomalies in this species and highlighting the need for systematic documentation of such rare occurrences in wild raptor populations.

Abstrakt: Aberácie operenia u voľne žijúcich vtákov sú dobre zdokumentované, hoci u veľkých dravcov, najmä u druhov žijúcich vo vysokých nadmorských výškach, ako je sup snežný (*Gyps himalayensis*), sú zaznamenávané len zriedka. V predloženej práci uvádzame zriedkavý prípad mutácie hnedého operenia pozorovaný u mladého supa snežného v Harijáne v Indii. Morfologické charakteristiky sú v súlade so známymi popismi hnedých aberácií na báze eumelanínu, čo poskytuje cenný pohľad na pigmentové anomálie u tohto druhu a zdôrazňuje potrebu systematického dokumentovania takýchto zriedkavých výskytov v populáciách dravých vtákov vo voľnej prírode.

Key words: birds of prey, eumelanin, feather colouration, mutation, pigmentation

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Introduction

Plumage aberrations in wild birds have been widely reported over several decades across diverse taxa and regions (Sage 1963; Piacentini 2001; van Grouw 2006; Franz & Fleck 2009; Mancini et al. 2010). These anomalies typically result from genetic or developmental disruptions affecting melanin synthesis, deposition, or distribution in feathers and skin, leading to conspicuous deviations from typical species-specific colouration. Among the commonly recognised pigment-based mutations are albinism, leucism, melanism, dilution, progressive greying, and brown (van Grouw 2006, 2013; Hume & van Grouw 2014).

The brown mutation represents a qualitative alteration of eumelanin, where incomplete oxidation leads to a chocolate-brown appearance, while phaeomelanin remains unaffected. Consequently, areas that are typically black appear as a lighter brown and are prone to solar bleaching, often fading further over time (van Grouw 2013). Eye colour is usually unaffected, but the bill and legs may appear paler than normal. This mutation is recessively

sex-linked and predominantly affects females (van Grouw 2006). While the melanocortin-1 receptor (MC1R) gene has been implicated in melanin-based colour variation (Robbins et al. 1993; Mundy 2005), most studies focus on melanism, and the molecular basis of brown mutations remains underexplored (Mundy et al. 2004; Nadeau et al. 2006). In field conditions, brown individuals are often misidentified as leucistic or diluted, complicating accurate diagnosis (van Grouw 2012).

Despite its visibility and genetic implications, confirmed records of brown mutations are rare in large raptors, possibly due to their low population densities, long life cycles, and the challenges of close-range observation. This scarcity is particularly evident in high-altitude scavengers, such as the Himalayan vulture (*Gyps himalayensis*), for which no prior published records of pigment anomalies have been found. In this note, we document a rare instance of brown plumage aberration in this species, contributing a new data point to the limited global record of plumage mutations in vultures.

Materials and Methods

The observation was made at the Jatayu Conservation Breeding Centre (JCBC) in Jodhpur village, Haryana (30.4369° N, 76.9480° E), a collaborative facility of the Haryana Forest Department and the Bombay Natural History Society. The centre occupies 5 acres adjacent to the Bir Shikargah Wildlife Sanctuary and functions as India's primary conservation breeding site for critically endangered vultures (*Gyps* sp.). Established in 2001 under the UK Darwin Initiative and subsequently upgraded following the South Asia Vulture Recovery Plan (2004), JCBC now holds the world's largest ex situ population of white-rumped (*Gyps bengalensis*), long-billed (*Gyps indicus*), and slender-billed (*Gyps tenuirostris*) vultures. As part of the reintroduction programme, supplementary feeding is provided outside the centre to attract wild vultures. This is done to attract wild birds, allowing our captive-bred individuals to successfully integrate and mingle with them after release. During routine observation, vultures feeding on provisioned goat carcasses were photographed and examined through binoculars. Species identification and assessment of plumage condition were performed using regional raptor field guides and standardised plumage aberration descriptions.

The authors declare that AI-assisted tools were used for grammar and language editing. All scientific content, data interpretation, and conclusions are the authors' own responsibility.

Results

On 2 October 2021, at approximately 10:30, during routine observation near the pre-release aviary of the JCBC, we recorded a mixed flock of wild vultures outside the centre, consisting of approximately 20 white-rumped vultures and 17 Himalayan vultures (Fig. 1). Among the assemblage, one individual stood out due to its uniformly pale brown appearance (Fig. 2). The vulture was actively feeding and showed no signs of abnormal behaviour, physical injury, or impaired mobility. Upon photographic documentation and subsequent analysis, the individual was identified as a juvenile Himalayan vulture based on morphological characteristics, including body size, structure, and head and bill shape, as described in regional raptor field guides.

This individual displayed uniform light brown plumage across all feather tracts, including contour, wing coverts, and flight feathers, deviating significantly from the typical dark brown colouration of juvenile Himalayan vultures. Bare parts, namely the bill, cere, legs, and feet, were pale yellow, and the iris was silvery-grey (Fig. 2), contrasting with the darker pigmentation usually seen in this species. The individual was not observed again in any subsequent surveys conducted from 2021 onward.

Discussion

To our knowledge, the observed individual represents the first documented case of a brown colour aberration in the Himalayan vulture. Given the species' extensive high-



Fig. 1. Natural and brown plumage aberration in the Himalayan vulture (*Gyps himalayensis*) recorded in Pinjore, Haryana, India.

Obr. 1. Prirodzená a hnedá aberácia operenia u supov snežných (*Gyps himalayensis*) zaznamenaná v Pinjore, Harijáne, India.

elevation distribution across the Himalayas and Tibetan Plateau (BirdLife International 2021), similar cases may remain undetected due to the remoteness and low observer presence across much of its range.

The observed individual showed no patchiness or localised depigmentation, indicating that the plumage was not the result of leucism, dilution, or other partial pigment-loss conditions. Instead, the uniform colouration suggests a systemic modification of eumelanin production. The phenotype conforms to what is described as a brown eumelanin-based mutation, a rare but recognised melanin aberration in wild birds (van Grouw 2013). The even distribution of brown colouration across all feather tracts supports a genetically regulated disruption of eumelanin oxidation rather than environmentally induced pigment loss. This interpretation effectively rules out albinism, progressive greying, or other depigmentation disorders. Colour aberrations in vultures are rare worldwide, but scattered reports exist across species. Most involve albinism or leucism, particularly in the turkey vulture (*Cathartes aura*), with records from North America (Sheffield 1992; Jones 1933), South America (Figueroa et al. 2011; Saavedra & Mora 2023), and the Caribbean (Zeiger et al. 2017). Other examples include partial albinism in the Eurasian griffon (*Gyps fulvus*) (Camiña 2005), leucism in the Andean condor (*Vultur gryphus*) (Pavez 2008), and albinism in the Egyptian vulture (*Neophron percnopterus*) (Cortés-Avizanda et al. 2010). A partially albino lappet-faced vulture (*Torgos tracheliotos*) was

reported by Clark and Leshem (1988), while Galván et al. (2025) linked leucism in the cinereous vulture (*Aegypius monachus*) to oxidative-stress pathways.

The current case contributes an important addition to the limited global record of colour aberrations in vultures and provides the first evidence of a brown eumelanin-based mutation within the Himalayan vulture. Although the ecological significance of such mutations remains unclear, individuals with aberrant traits may experience altered survival, mate choice, or social interactions. Continued field monitoring and photographic documentation of anomalous individuals, supported by targeted genetic analyses where possible, will help clarify the frequency and implications of melanistic and hypo-melanistic variants in vulture populations. This observation highlights the value of consistent long-term monitoring, and we encourage raptor researchers to report similar occurrences across the species' range.

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Fig. 2. Brown plumage aberration in a juvenile Himalayan vulture (*Gyps himalayensis*) recorded at Pinjore, Haryana, India.

Obr. 2. Hnedé sfarbenie peria mladého supu snežného (*Gyps himalayensis*) zaznamenané v Pinjore, Harijáne, India.



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