Record of Leucism in Indian Flying Fox *Pteropus giganteus* (Mammalia: Chiroptera: Pteropodidae) from South Gujarat, India

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Abstract:

Leucism in fruit bat species Pteropus giganteus (Brunnich, 1782) is recorded for the first time from India based on photographic evidence collected from the Anaval Village located in Surat District of South Gujarat, India. A total lack of pigmentation in the whole body due to the failure of melanocytes to migrate to the skin, and hair follicles, resulting in white or whitish hairs, pale skin, but normal coloured eyes are the sign of leucism. The present record can serve as baseline data and will also help understand colour aberration in bats.

Key Words: Colour aberration, Chiropteran, Pigmentation, Mutation

Introduction:

The Indian Flying Fox is one of the most common and widely distributed chiropterans found in India, Pakistan, Sri Lanka, Bhutan, Nepal, Bangladesh, Maldives, Myanmar and China (Tsang 2020; Johnsingh & Manjrekar 2013; Srinivasulu & Srinivasulu 2012). Flying Fox is the largest fruit bat known to occur on mainland India (Bates et al. 1994) out of 13 Indian fruit bat species (Bates & Harrison 1997; Srinivasulu et al. 2010). It has a reddish-brown head with a darker, sometimes blackish, snout; pale brownish-yellow shoulders and hindneck, yellowish-brown ventrally and black wings (Prater 1971). It is a colonial species and roosts during the day, often in the midst of busy towns, villages, on large trees along the roadside, near cropland and water bodies (Bates et al. 1994; Johnsingh & Manjrekar 2013; Menon 2014). Their roosting

Figure 1: Leucistic individual roosting along with the normal individuals

colonies are generally found on large trees such as *Ficus benghalensis, F. religiosa*, *Tamarindus indica*, *Mangifera indica*, *Dalbergia sissoo* and *Eucalyptus sp* (Vendan 2003) and the colony size can vary from hundreds to several thousands of individuals (Bastawade & Mahabal 1976). Although fruit bats are responsible for many ecological services (Saikia 2018), yet Indian Flying Fox is one of the most persecuted fruit bats in South Asia and is listed as vermin under Schedule V of the Indian Wildlife (Protection) Act and IUCN Red List Data included it as a Least Concern species (Tsang, 2020).

In mammals, a wide variety of colours and forms are found as a result of the presence of certain pigments, mostly melanin which provides colour to the skin, hairs and eyes (Nordlund et al. 1998; Uieda 2000; Lucati & López Baucells 2016). Often this pigment is affected as a result of mutations giving rise to diverse colour aberrations. The effect of such abnormal colouration is generally the pigmentation anomalies of chromatic disorders (Rook et al. 1998). Similar to other mammals, bats are also vulnerable to genetic disorders that affect pigmentation. Globally, such chromatic disorders are being reported at an increasing rate in bats (Lucati & López Baucells 2016) and are caused by either an increase or a decrease in the production of melanin in some regions or over the entire body (Hofreiter & Schoneberg 2010; Abreu et al. 2013). These include albinism, leucism, piebaldism, hypomelanism and melanism (Lucati & López Baucells 2016). Among these conditions, leucism stands out as a rare phenomenon in nature.

Leucism is a total lack of pigmentation in the whole body due to the failure of melanocytes to migrate to the skin, and hair follicles, resulting in white or whitish hairs, pale skin, but normal coloured eyes. It occurs regardless of the normal production of the enzyme tyrosinase and melanin. Moreover, it can be caused by one of the several mutations that will give rise to apparently similar phenotypes (van Grouw 2006, 2013; Abreu et al. 2013; Lucati & López- Baucells 2016). The occurrence of colour aberration in 55 Indian mammalian species has been compiled by Mahabal et al. (2019). Although cases of albinism and piebaldism have been reported in the family Pteropodidae (Neal 1971; Karim 1983; Anonymous 2012; Anonymous 2013), however, there is no report on colour aberration in Indian Flying Fox (*Pteropus giganteus*). Here we report the first case of leucism in Indian Flying Fox from Surat district of South Gujarat, India.

Observations:

On 18 June 2017, we were on the way to Vansda National Park and at 1230 h we stopped as we saw a group of Indian Flying Fox roosting on *Ficus religiosa*, near Anaval Village (20.838°N, 73.263°E) in Surat District, Gujarat. Suddenly all the fruit bats flew in the sky, as a local was hunting them with the help of a catapult maybe for eating purposes. In the middle of all these, at 1249 h a white bat flying in the sky grabbed our attention as it flew further to roost on one of the branches with other Indian Flying Fox. We took some photographs (Figure 1) and observed with the help of binoculars to note down its characteristics. Its whole body i.e. both fur and skin were white or whitish including patagium and ears but it had normal black coloured eyes. With the help of the classification proposed by Lucati & López Baucells (2016), we identified it as a case of leucism and not albinism.

The roosting colony had around 250 individuals and was situated near a village pond among human habitation on the roadside. We observed the leucistic individual at least for an hour and also alerted the locals to cease hunting of bats. The leucistic individual was probably a female and showed similar activity as that of normal individuals such as opening and closing of wings, folding the wings around belly and grooming.

Discussion:

Although physiological causes of colouration, including melanism, are evident (Caro 2005), the genetic processes responsible for these colour variations remain unknown in most mammals (Lucati & López Baucells 2016). Moreover, chromatic disorders in bats can affect both fur and skin, including patagium, ears, and muzzle, and their impact on the survival rate is vague (Lucati & López Baucells 2016). However, bats are most likely less vulnerable to predation than the majority of diurnal animals as they are active at night and prefer dark roosting sites (Buys et al. 2002; Rocha et al. 2013). Lucati & López Baucells (2016) states that aberrant individuals roosting in sheltered places such as caves, mines, and buildings may have greater survival rates than the one roosting in the open leaves. Here, we found the leucistic Indian Flying Fox roosting in the open leaves and is likely to be vulnerable to predation.

Albinism is one of the most commonly occurring colour aberrations in bats (Lucati & López Baucells 2016). In the family Pteropodidae, albinism has been reported in *Cynopterus sphinx*

from Nepal (Anonymous 2013), *Lissonycteris angolensis* from Uganda (Neal 1971) and *Rousettus leschenaultia* from India (Karim 1983), while piebaldism is reported in *Rousettus amplexicaudatus* from Philippines (Anonymous 2012). However, another such colour aberration leucism is not yet reported from the family Pteropodidae. In this regard, our report of leucism in *Pteropus giganteus* can be the first of its kind in the entire range of its distribution.

Today, bats in India face the harsh reality of declining habitats and resources, ultimately making them disappear altogether (Graham 2001; Tsang 2020) and the people's perception regarding the presence of bats in their surroundings for different myths. These facts raise an urgent need to protect bats throughout the world by studying more about their behaviour and ecology. Further, studies on *Pteropus giganteus* from Gujarat are mainly sighting reports (Mahato et al. 2012) and on roosting sites (Vyas & Upadhyay 2014). Due to the lack of information on colour aberration in the family Pteropodidae, this report can add importance to bat biologists.

Acknowledgement:

We are thankful to Dhaivat Patel and Vivek Patel for assisting us in fieldwork.

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Suggested citation:
Amin, S; Patel, H; and Vaghela P (2021). Record of Leucism in Indian Flying Fox Pteropus giganteus (Mammalia: Chiroptera: Pteropodidae) from South Gujarat, India. Prithivya, An Official Newsletter of WCB Research Foundation and WCB Research Lab. Vol 1(2) 12-17.