

Melanistic northern red muntjac (*Muntiacus vaginalis*) in Nilgiris, Tamil Nadu, India

Muntíaco rojo del norte (*Muntiacus vaginalis*) melánico en Nilgiris, Tamil Nadu, India

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Melanism, the dominance of dark brown eumelanin over pheomelanin, is a rare condition in the Northern red muntjac (*Muntiacus vaginalis*) in India, resulting in a markedly darker pelage. This study reports a rare case of melanism in the northern red muntjac in the Upper Nilgiris, Tamil Nadu. On March 5, 2024, we observed 2 muntjacs feeding in an invasive species eradication area in Kottagiri, one of which exhibited a distinctive dark brown, nearly black coloration, suggesting melanism. This is one of only 6 documented cases of melanism in this species in India. The Nilgiris' high-altitude habitat, with dense vegetation and humid conditions, aligns with environments where other melanistic mammals have been reported, suggesting potential ecological factors at play. Further studies are warranted to explore the ecological and genetic bases of melanism in this species in the Nilgiris.

Key words: Atypical pigmentation; Cervidae; ecological adaptation; Indian mammals; melanism.

El melanismo, predominancia de la eumelanina marrón oscura sobre la feomelanina, es una condición rara en el muntíaco rojo del norte (*Muntiacus vaginalis*) en India, lo que resulta en un pelaje notablemente más oscuro. Este estudio informa un caso raro de melanismo en el muntíaco rojo del norte en la región superior de Nilgiris, Tamil Nadu. El 5 de marzo de 2024, observamos 2 muntíacos alimentándose en un área de erradicación de especies invasoras en Kottagiri, uno de los cuales presentaba una coloración marrón oscuro distintiva, casi negra, lo que sugiere melanismo. Este es solo uno de los 6 casos registrados de melanismo en esta especie en India. El hábitat de gran altitud en Nilgiris, con vegetación densa y condiciones húmedas, coincide con entornos donde se han reportado otros mamíferos melanísticos, lo que sugiere posibles factores ecológicos. Se necesitan estudios adicionales para explorar las bases ecológicas y genéticas del melanismo en esta especie en Nilgiris.

Palabras clave: Cervidae; mamíferos de la India; melanismo; observación de vida silvestre; pigmentación atípica.

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The northern red muntjac, or barking deer (*Muntiacus vaginalis*), is a small and shy cervid species widely distributed across South and Southeast Asia ([Habiba et al. 2021](#); [Singh et al. 2022](#)). This species is characterized by its chestnut-red coat, dark brownish-black facial markings, and small antlers ([Timmings et al. 2016](#)). Despite its adaptability to diverse habitats, including areas near human settlements, the population of the northern red muntjac is facing a decline due to habitat fragmentation caused by scattered human settlements, urbanization, and developmental activities ([Jnawali et al. 2011](#); [Mishra 1982](#)).

Melanism, a phenotype resulting from the dominance of dark brown eumelanin over reddish-yellow pheomelanin, leads to a very dark pelage ([Kettlewell 1973](#)). While melanism has been documented in several mammalian species in

India, it remains an extremely rare occurrence in the northern red muntjac, with only a few recorded cases in the country ([Mahabal et al. 2019](#)). In this note, we report a rare case of melanism observed in the northern red muntjac from the Upper Nilgiris, Tamil Nadu, India, contributing to the limited knowledge of this unique phenotype in the species.

The Nilgiris district (11° 00' 00" N – 12° 00' 00" N and 76° 00' 00" E – 77° 15' 00" E) is situated in the southern part of the Western Ghats in Tamil Nadu, India, covering an area of 2,543 km². This region forms a mountainous plateau at the confluence of the Eastern and Western Ghats, featuring an elevation range of 300 to 2,700 m. The climate in the Nilgiris exhibits considerable variation, with summer maximums reaching 21–25 °C and winter minimums dropping to 10–12 °C. The upper Nilgiris is characterized by montane shola

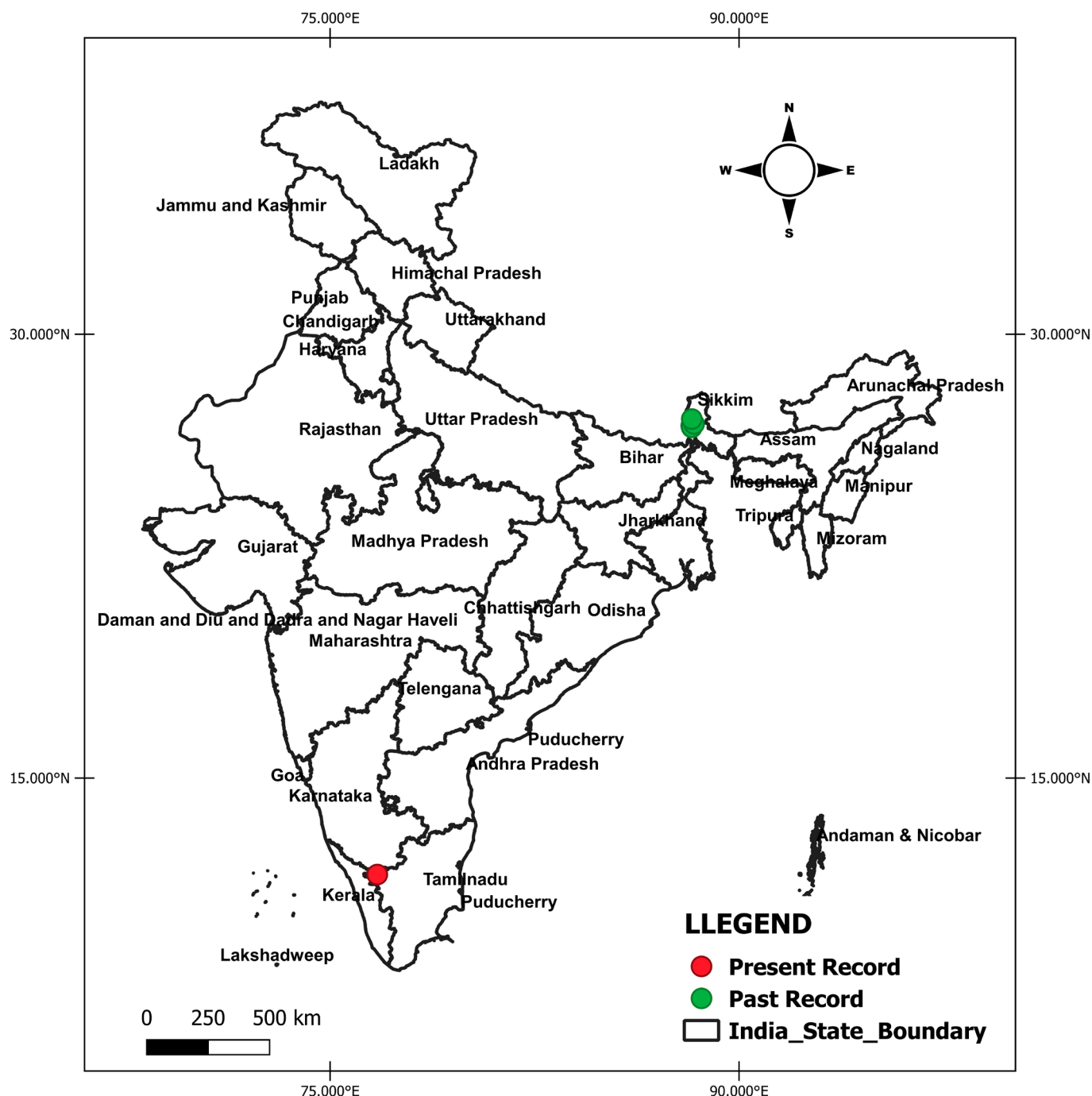


Figure 1. Map showing the past (green dot) and present (red dot) records of melanistic northern red muntjac (*Muntiacus vaginalis*) in the Upper Nilgiris, Tamil Nadu, India.

grasslands, interspersed with plantations of exotic species such as wattle (*Acacia* spp.), blue gum (*Eucalyptus* spp.), and pine (*Pinus* spp.), contributing to a unique ecological landscape (Santhoshkumar and Kannan 2016).

As part of conservation efforts in this region, invasive alien species removal programs have been implemented to restore native vegetation. During fieldwork in Kotagiri, specifically monitoring the growth of plant species after the removal of invasive species, we observed a Barking Deer (*Muntiacus muntjak*) in the area. This sighting highlights

the ecological significance of habitat restoration and its potential benefits for native wildlife.

On March 5, 2024, at 13:30 hr, we recorded 2 northern red muntjacs feeding in an invasive species eradication area in Kottagiri (11° 25' 42.49" N, 76° 51' 11.57" E, 1,981 m), Nilgiris, Tamil Nadu, India. We captured photographs and video footage of these individuals. Upon close examination of the media, we observed that 1 individual displayed a completely different coloration, appearing dark brown, almost black (Appendix 1). Based on this

distinct coloration, we concluded that this northern red muntjac exhibited melanism.

Melanism can be defined as the excessive deposition of the pigment melanin resulting in an atypically dark individual (Kettlewell 1973). Such color aberration is quite common in mammals (Caro 2005). The natural coat color of the northern red muntjac grayish brown, reddish, or dark brown (Menon 2014). In India, only 5 prior records document melanism in the northern red muntjac (Figure 1). Inglis (1952) noted "very dark brown and nearly black barking deer" in the forests of Darjeeling District (27° 2' 45.6" N, 88° 14' 42.0" E), West Bengal. Sunar et al. (2012) reported a dark-colored individual in Senchal Wildlife Sanctuary (26° 59' 34.8" N, 88° 15' 54.0" E), also in Darjeeling District, West Bengal. Choudhury (2014) referenced a dark-colored coat observed by the Forest Department in Kitam Bird Sanctuary (27° 6' 25.2" N, 88° 21' 0.0" E), Wildlife Wing, Namchi, Sikkim in October 2013. Additionally, Choudhury (2014) documented a dark brownish-grey northern red muntjac near Legship (27° 15' 57.6" N, 88° 15' 57.6" E) close to Pelling, West Sikkim, on June 15, 2014.

The Nilgiris is a mountainous habitat characterized by dense vegetation, with altitudes reaching up to 2,500 m. Historical evidence suggests that similar vegetation exists in mountainous regions such as Darjeeling in West Bengal and Namchi and Pelling in Sikkim. This evidence supports the theory that tropical ecosystems may reinforce the idea that melanism offers a survival advantage in certain ecological contexts (Caro 2005; Allen et al. 2010).

Furthermore, a hypothesis suggests a link between darker individuals and environments characterized by high moisture levels and dense vegetation (Gloger 1833; Cott 1940; Ulmer 1941; Ortolani and Caro 1996).

Factors such as habitat fragmentation, environmental stress, and inbreeding may play a role in the occurrence of melanism (Tougas 2011; Ramakrishnan et al. 2016). Therefore, further observations are needed to clarify the reasons for the presence of melanism in the northern red muntjac in the Nilgiris.

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Appendix list

Appendix 1. Melanistic northern red muntjac (*Muntiacus vaginalis*) in the Upper Nilgiris, Tamil Nadu, India. Video of S. Karthick, available at: <https://doi.org/10.5281/zenodo.15066003>.