A record of a melanistic rusty-spotted genet (*Genetta maculata*) from Lake Naivasha, Kenya

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INTRODUCTION

Although natural variability in the coat patterns of mammals exists, genetic mutations can occasionally result in melanistic (much blacker or browner than normal) individuals (Delibes, Mézan-Muxart & Calzada, 2013). Melanism has been recorded in several families of mammalian carnivores, including the viverrids (Delibes *et al*., 2013). Amongst wild carnivores, it is believed that melanistic individuals are comparatively more common than albino individuals because the traits associated with albinism are linked to fitness costs such as visual impairment, heightened sensitivity to solar radiation, and decreased camouflage (Acevedo, Aguayo-Lobo & Torres, 2009). However, despite its relative prevalence, the adaptive significance of melanism in wild carnivores is not clear (Elizalde *et al*., 2020).

The rusty-spotted genet (*Genetta maculata*), also known as the Central African large-spotted genet, is widely distributed in sub-Saharan Africa, ranging from Ghana to Eritrea and Somalia and southwards to central Namibia and the KwaZulu-Natal province of South Africa (Angelici, Gaubert & Do Linh San, 2016; Roux *et al*., 2016). Based on five trapped individuals and road fatalities, Taylor (1970) speculated that *G. maculata* likely occurred predominantly in the wetter areas (but where annual rainfall was <1600 mm) and below an elevation of 3000 m in East Africa. Significantly, Taylor (1970) noted that melanistic *G. maculata* individuals were 'certainly common' in parts of Kenya, citing the collection of the five specimens from near Nairobi, Kinangop, Naivasha and the Mau escarpment. Although more recent anecdotal evidence of melanistic rusty-spotted genets has emerged (e.g. https://www.atta.travel/member-news/2019/07/rare-melanistic-genet-seen-at-ang ama-mara/), none of these have been scientifically verified. Here, we provide the first scientifically documented case of melanism in *G. maculata* for Kenya since Taylor's (1970) assessment.

METHODS

Lake Naivasha (lat. = –0.76775934°/lon. = 36.355504°) is situated approximately 75 km NW of Nairobi, Kenya. Lotus Island, on Lake Naivasha, covers an area of approximately 1.6 ha. Although normally separated from the mainland, seasonal changes in water levels create land bridges between the island and the mainland periodically. The area is characterized by an equatorial climate but with temperatures moderated by the lake's relatively high altitude (1884 m a.s.l.). The area receives a mean annual rainfall of approximately 800 mm. The island is home to several medium and large terrestrial mammal species, including hippopotamus (*Hippopotamus amphibius*), waterbuck (*Kobus ellipsiprymnus*) and vervet monkeys (*Chlorocebus pygerythrus*). The dominant vegetation on the island is *Vacheliia xanthophloea* woodland but with *Cyperus papyrus* reedbeds along the Lake shore.

The Lake Naivasha Yacht Club is located on Lotus Island and was established in 1932. There are verbal records among club members of 'black genet' sightings on the island from the 1980s and 1990s; however, these melanistic individuals were never photographed. Between 2019 and 2021, what was thought to be a melanistic genet was observed. On 14 August 2021 and 9 October 2021, C.W. visited the island to photograph the individual for identification to species level.

To allow species identification, a photograph showing the whole body of the putatively melanistic animal was processed in Adobe Photoshop Lightroom Classic (v. 11.0.1.). To reveal all the key features in the coat and along the tail, the contrast, highlights, black tones and vibrance levels were

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reduced to the minimum (–100), while the shadows, white tones and clarity levels were increased to the maximum (+100). In addition, exposure was increased to +5 IL.

RESULTS AND DISCUSSION

C.W. captured numerous photographs of one suspected melanistic genet that appeared to visit the yacht club on multiple occasions. This individual is best represented by the image in Fig. 1a. The animal's coat was dark to black, and its underlying coat pattern could only be uncovered through computer-assisted image processing (Fig. 1b). It was identified as a rusty-spotted genet based on 1) the presence of a limited number of large dark blotches (of square or round shape) in the first two dorsal rows; 2) the absence of an erectile mid-dorsal crest (but a mid-dorsal stripe is visible); 3) the presence of eight pale/white tail rings; and 4) the presence of a long, black tail tip (Gaubert, Chalubert & Dubus, 2008; Hunter & Barrett, 2018; Jennings & Veron, 2009).

Only two other genet species are present in Kenya: the common genet (*G. genetta*) and the servaline genet (*G. servalina*) (Taylor, 1970). In contrast to the rusty-spotted genet, both other

Fig. 1. **a**, Melanistic rusty-spotted genet photographed with a strobe flash on 9 October 2021 on Lotus Island, Lake Naivasha, Kenya. **b**, The same photograph processed in Adobe Photoshop Lightroom Classic to uncover the underlying coat and tail ring patterns (see text for details on species identification). Photograph Craig Wood.

species have a pale or white tail tip, even though this can also be a feature of *G. maculata* individuals with a severed tail tip (E. Do Linh San, pers. obs.). The common genet also differs from the rusty-spotted genet by having a mid-dorsal crest and much smaller spots on the flanks that often merge into longitudinal lines. The number of pale or white tail rings varies from 8 to 10 in the common genet, which overlaps with the 7 to 10 pale rings observed in the rusty-spotted genet. However, in rusty-spotted genets the last pale ring, towards the tail tip, is thin and is only present on the ventral side, and therefore barely visible (Fig. 1b). This final pale 'ring' is due to the suffusion of the last two dark rings, hence giving the impression of the presence of an elongated distal black tail tip, as is typical for species of the large-spotted genet species complex such as *G. maculata* (Gaubert *et al.*, 2008; E. Do Linh San, pers. obs.). Like rusty-spotted genets, servaline genets also lack the presence of an erectile mid-dorsal crest. However, despite a broad variation (David Mills, pers. comm., 2017), their bodies usually appear more uniformly spotted (E. Do Linh San, pers. obs.). The number of pale rings on the tail is reported to vary from 8 to 12 (Jennings & Veron, 2009), but most individuals have between 10 and 13 pale rings (E. Do Linh San, pers. obs.).

Melanism in African genets is relatively uncommon and appears to be isolated geographically (Ahmim *et al.*, 2021). For example, in sub-Saharan genet species, the frequency of melanism ranges between 1 and 11% (Ahmim *et al.*, 2021). However, melanism is more prevalent amongst introduced common genet populations in Europe (Gaubert & Mézan-Muxart, 2010; Barbosa & Perry, 2020; Ahmim *et al.*, 2021). Nevertheless, melanism within populations can be a sign of inbreeding (Roff & Fairbairn, 2013). Whether inbreeding is the cause for the melanistic rusty-spotted genet in our study is unknown even though non-melanistic genets are also sighted occasionally on Lotus Island (C. Wood, pers. obs.). Inbreeding occurs when populations become small enough that related individuals are forced to breed with one another, resulting in deleterious or recessive alleles being expressed more frequently (Crnokrak & Roff, 1999). Fragmentation of populations can occur when impenetrable barriers are placed between them, driving inbreeding. Lotus Island is normally surrounded by water, effectively separating it and its animal populations from the mainland. Such a scenario could have resulted in the genetic isolation of the rusty-spotted genet population of the island. However, since we have no direct evidence for the frequency of the formation of these land bridges, more comprehensive genetic sampling of the rusty-spotted genet individuals on the island would have to be conducted to verify this contention.

Our study represents the first scientifically verified report of melanism in *G. maculata* in East Africa in more than 50 years. Melanism in other East African carnivores has been linked to altitudinal differences with more melanistic individuals being recorded at higher altitudes, presumably because of genetic isolation (Elizalde *et al.*, 2020). We therefore recommend further assessments of the extent of melanism, and potential inbreeding, in rusty-spotted genets in Kenya to determine the prevalence of this genetic mutation. Camera trapping along predefined transects would be a logical first step.

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