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Research note

Margays also hide their spots: first records of melanistic *Leopardus wiedii* from Colombia and Costa Rica

El margay también esconde sus manchas: primer registro de Leopardus wiedii *melánico de Colombia y Costa Rica*

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Abstract

Melanism has been commonly recorded in tropical felids, especially within the genus *Leopardus*. However, so far there are no reports of the existence of melanism in *Leopardus wiedii*. Herein, we present the first report of melanistic individuals of margays, obtained in Colombia and Costa Rica. The low frequency and scarcity of melanistic margay records along its distribution reflect that this is potentially not an ecological or adaptive advantage for the species, and likely the mutation is not established, or even follows a random frequency in the populations.

Keywords: Cryptic species; Melanism; Mutation; Natural history; Wild felids

Resumen

El melanismo ha sido comúnmente registrado en felinos tropicales, especialmente del género *Leopardus*. Sin embargo, hasta ahora no ha habido reportes de la existencia de melanismo en *Leopardus wiedii*. Aquí presentamos los primeros reportes de individuos melánicos de margay obtenidos en Colombia y Costa Rica. La baja frecuencia y escases de registros de margay melánicos a lo largo de su distribución posiblemente refleja que este fenómeno no sea una ventaja ecológica ni adaptativa para la especie, y posiblemente la mutación no se ha establecido o su frecuencia es incluso aleatoria en la población.

Palabras clave: Especie críptica; Melanismo; Mutación; Historia natural; Felinos silvestres

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The long-tailed spotted cat or margay, *Leopardus wiedii* (Schinz, 1821), is a widespread species in the Neotropics, distributed from south-central Mexico to northern Argentina, exhibiting high genetic diversity and high degree of population structure (de Oliveira, 1998; Eizirik et al., 1998). Typically, the species shows a wide range of color and pattern variation throughout its distribution; from a pale buff-grayish or yellowish to a brownish-ochreous or cinnamon on the back and with a whitish color on the ventral surface. The most common spot pattern consists of large solid or open dots on the back and large and complete rosettes or longitudinal stripes along the sides of the body (de Oliveira, 1998; Wilson & Mittermeier, 2009). Melanism occurs as a common polymorphism in tropical felids (Tischendorf & McAlpine, 1995), especially within the genus *Leopardus* (Eizirik et al., 2003). So far, 13 of the 36 species of wild felids have documented records (Schneider et al., 2012), explained by 2 potential evolutionary hypotheses, but with little information regarding its ecological significance (Eizirik & O´Brien, 2003). In felids, melanism is due to a recessive allele and has been shown to have arisen independently at least 4 times, and it is often associated causally with a selective advantage for hunting. Despite this being a common phenomenon, so far there are no reports of the existence of melanism for *L. wiedii* throughout its distribution in the Americas.

Here we present the first records of melanism in margay from Colombia and Costa Rica. Both records were obtained using camera-traps for estimating occurrence and occupancy of medium- and large-sized mammals in mountain ecosystems.

The locality record for Colombia was obtained in a mountain rainforest at La Cumbre (11°06’14.8” N, 74°2’46.3” W; 2,313 m asl) in the Toribio River basin, Magdalena Department, most likely one of the highest altitudinal records for the species in its range. The records were obtained through video recordings using infrared motion activated camera-traps (Moultrie M880), active for 15 days. The individual was recorded on September 22nd 2013, at 02:54 h in a secondary forest fragment surrounded by livestock pastures. In the video, both, melanistic and typical color pattern individuals are recorded walking in front of the camera, with no other activities detected (Fig. 1a, b). The color pattern of the melanistic individual is much darker and the spots along the body are barely apparent.

The locality record for Costa Rica corresponds to Finca Las Alturas in Las Tablas Protected Zone (08°57’46.25” N, 82°52’34” W; 1,529 m asl) in the Cedro River basin, Puntarenas Province. Las Tablas Protected Zone (Zona Protectora Las Tablas-ZPLT) is a private land protected area considered part of the National System of Conservation Areas (SINAC), located in the southern zone of Costa Rica in the Talamanca Ecoregion (González-Maya et al., 2014). The Talamanca Mountains is the most important non-fragmented forested area of Mesoamerica, extending from south-eastern Costa Rica to north-western Panama (González-Maya et al., 2012). The individual record was also obtained through infrared camera traps running for 6 months in camera mode (Reconyx HC500 HyperFire). The individual was recorded on February 9th 2014 at 04:07 h (Fig. 1c), in a continuous primary forest patch. We obtained 13 pictures in total, all suspected to be of the same individual. In the same locality, the normal spotted fur pattern was also recorded (Fig. 1d).

Although it has been reported that the color pattern of margay in mountain areas is in general significantly darker than those in lowlands (Jorgenson et al., 2006), in both of our study areas there are clearly 2 color patterns co-occurring sympatrically. To our knowledge there are no previous records of melanistic individuals of margay populations across its distribution in the Americas, in contrast to the reports for other members of the genus *Leopardus* such as the Oncilla (*L. tigrinus*), Geoffroy's cat (*L. geoffroyi*) and Kod Kod (*L. guigna*), for which, apparently, this melanistic condition is more common (Eizirik & O´Brien, 2003; Eizirik et al., 2003). Eizirik et al. (2003) suggested that melanistic mutants have a possible adaptive advantage under certain ecological circumstances, setting the jaguarundi as an example. However, the melanistic condition can be an adaptive advantage for this species but not necessarily for another,

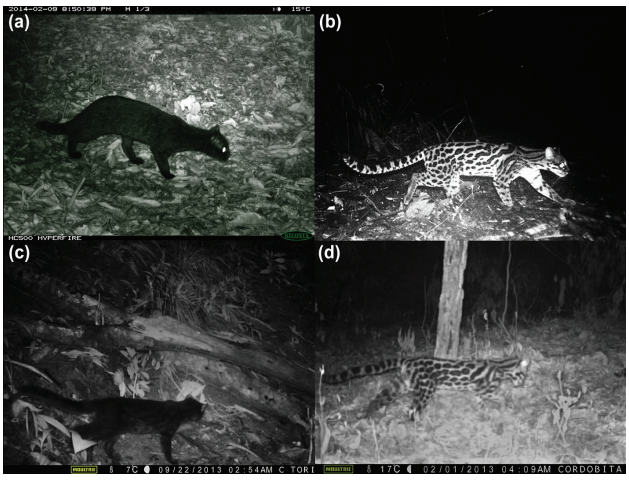

Figure 1. First records of melanistic *Leopardus wiedii* from Colombia (a) and Costa Rica (c), and the sympatric typical color patterns from the same localities (b, d).

because ecological circumstances differ between both species. Margays are active nocturnally, use predominantly old secondary growth forests, and show more arboreal habits, preying mostly on arboreal species, in contrast to jaguarundi which is primarily diurnal and terrestrial (de Oliveira, 1998; Giordano, 2016).

The low frequency and scarcity, or even absence, of melanistic margay records across its distribution likely reflects that this is potentially not an ecological and/or adaptive advantage for the species (i.e., increased fitness), and potentially the mutation is not established in the populations, thus is more likely a random selection. The occurrence of sympatric records of both color patterns or phenotypes, potentially indicates that there are no ecological factors that drive the occurrence of melanism on wild populations of *L. wiedii*. However, it is important to highlight that the Costa Rican locality is remarkable in terms of the frequency of other melanistic species. Field surveys have recorded melanistic jaguar (*Panthera onca*) and the little spotted cat/oncilla (*L. tigrinus*), thus reinforcing the theory that selective factors (ecological or otherwise) are influencing the expression of these forms in some wild cat populations.

These findings represent remarkable new records, contributing to the knowledge of one of the most cryptic and unknown felid species in the Neotropics. Despite the fact that these only represent opportunistic observations, it seems that this phenomenon is potentially more common than suspected; nevertheless, the ecological and evolutionary significance still remains to be discovered.

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