

First confirmed record of an albino raccoon *Procyon lotor* for México

Primera cita de un mapache albino (*Procyon lotor*) en México

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Albinism is defined as the complete loss of pigment in the entire body (Silva-Caballero *et al.* 2014). It is recognized by the abnormal color of the skin, fur, feathers, scales and eyes (McCardle 2012). Although variations exist, true albinism is considered the complete absence of tegumentary and retina pigmentation (Sandoval-Castillo *et al.* 2006). Partial albinism is shown when the pigment is reduced and absent in skin, feathers and eyes (Berdeen & Lotis 2011); for example, leucism is a partial albinism created by one gene (Allen & Neill 1955, Lotze & Anderson 1979, Long & Hogan 1988, McCardle 2012), unlike albinism that is triggered by the action of various genes. Albinism is usually attributed to environmental factors like low habitat quality and diet (Bensch *et al.* 2000) and has been documented in an extensive variety of species including the major classes: amphibians, reptiles, birds and mammals. In the group of terrestrial mammals, complete albinism has been reported in coyote (Canidae, *Canis latrans*), skunk (Mephitidae, *Mephitis mephitis*), ferret (Mustelidae, *Mustela putorius furo*), raccoon (Procyonidae, *Procyon lotor*), bear (Ursidae, *Ursus americanus*), opossum (Didelphidae, *Didelphis virginiana*), cottontail rabbit (Leporidae, *Sylvilagus floridanus*) rhesus macaque (Cercopithecidae, *Macaca mulatta*), elephants (Elephantidae, *Elephas* sp.) and some rodents (McCardle 2012).

In México, the Family Procyonidae is represented by seven species of four genera (*Bassariscus astutus*, *B. sumichrasti*, *Nasua nasua*, *Procyon lotor*, *P. pygmaeus*, *P. insularis* and *Potos flavus*) (Ceballos & Oliva

2005), and variations in color have been reported at the global level (Jones 1923, Stuewer 1943, Allen & Neill 1955, McCardle 2012). Nevertheless, in spite of being a family with distribution throughout the entire country, little information exists regarding the color variations. In addition, the reported data correspond to the individuals of the white-nosed coati that exhibited leucism in the southeast of México (Silva-Caballero *et al.* 2014). The raccoon (*P. lotor*) is a common species in the country, is of medium size and sturdy body, with long fur and coloring that varies from grayish to blackish with yellowish or brownish tones on the dorsal part. The abdomen varies from a brownish-yellow color to grayish, and the face has a mask that extends to the nose (Lotze & Anderson 1979, Valenzuela-Galván 2005). It is of twilight habits, and plant material constitutes from 48% to 70% of its diet, complemented by invertebrates and, in a smaller proportion, some vertebrates such as fish, frogs or tortoises (Valenzuela-Galván 2005).

In 2016, we performed systematic monitoring in forests under the forestry management of the state of Michoacán: a total of 59 camera traps were installed (Moultri M880) for 155 days. In one of the cameras (Lat: 19.530389°, Long: -101.750222° WGS 84) that was active from September 28 to November 5, a female raccoon was captured with four kits, one of them exhibiting complete albinism with a total lack of pigment (Fig. 1). The group was recorded for six different days (October 12, 15, 16, 19, and 21 and November 5); for the last recording, the albino kit did not appear in the photographs. The site is located



Figure 1. Family of raccoons, young and the mother, in the image you can see the albino individual with absence of pigments.

in forests of oak to pine transition and are subject to wood extraction for forestry use, with the extraction mainly of the genus *Pinus* sp. The recording site is located 6,100 linear m from Pátzcuaro Lake, one of the most important water reservoirs in western México. There is very little information that evaluates the costs for the individuals that have chromatic aberrations (Silva-Caballero *et al.* 2014). Nevertheless, it is considered a condition that negatively affects the individuals that possess it, since it can affect their survival by making them more conspicuous to predators. The disappearance of the individual albino could correspond to this condition. In accordance with Silva-Caballero *et al.* (2014), the chromatic aberrations can be related to small and isolated populations, but in the case of the recording presented here, the state of connectivity or genetic isolation of the populations is unknown. Conducting specific studies of connectivity, isolation and the genetics of the species is necessary. Being common in México garners little attention, but it could be an example of the status of the populations of other mesocarnivores present in the region.

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References

- Allen R. & Neill W.T. 1955. Albinistic sibling raccoons from Florida. *Journal of Mammalogy*, 37: 120.
- Bensch S., Hansson B., Hasselquist D. & Nielsen B. 2000. Partial albinism in a semi-isolated population of great reed warblers. *Heredity*, 133: 167-170. DOI: [10.1111/j.1601-5223.2000.t01-1-00167.x](https://doi.org/10.1111/j.1601-5223.2000.t01-1-00167.x)
- Berdeen J. & Lotis D. 2011. An observation of a partially albinistic *Zenaida macroura* (mourning dove). *Southeastern Naturalist*, 10: 185-188.
- Ceballos G. & Oliva G., 2005. *Los mamíferos silvestres de México*. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad/Fondo de Cultura Económica, Ciudad de México, México, 409 pp.
- Jones S.V.H. 1923. *Color Variations in Wild Animals*. *Journal of Mammalogy*, 4: 172-177. DOI: [10.2307/1373567](https://doi.org/10.2307/1373567)
- Long C.A. & Hogan A. 1988. Two Independent Loci for Albinism in Raccoons, *Procyon lotor*. *Journal of Heredity*, 79: 387-389. DOI: [10.1093/oxfordjournals.jhered.a110534](https://doi.org/10.1093/oxfordjournals.jhered.a110534)

- Lotze J.-H. & Anderson S., 1979. *Procyon lotor*. *Mammalian Species*, 119: 1-8. DOI: [10.2307/3503959](https://doi.org/10.2307/3503959)
- McCardle H. 2012. *Albinism in Wild Vertebrates*. Thesis Master of Science. University San Marcos.
- Sandoval-Castillo J., Mariano-Melendez E. & Villavicencio-Garayzar C., 2006. New records of albinism in two elasmobranchs: the tiger shark, *Galeocerdo cuvier* and the giant electric ray, *Narcine entemedo*. *Cybium*, 30: 191-192.
- Silva-Caballero A., Montiel-Reyes F., Sánchez Garibay E. & Ortega J., 2014. Leucism in the white-nosed coati *Nasua narica* (Mammalia: Carnivora), in Quintana Roo, Mexico. *Therya*, 5: 839-843. DOI: [10.12933/therya-14-193](https://doi.org/10.12933/therya-14-193)
- Stuewer F.W. 1943. Raccoons: Their Habits and Management in Michigan. *Ecological Monographs*, 13: 203-257. DOI: [10.2307/1943528](https://doi.org/10.2307/1943528)
- Valenzuela-Galván D. 2005. Mapache, in: Ceballos, G., Oliva, G. (Eds.), *Los Mamíferos Silvestres de México*. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad/Fondo de Cultura Económica, Ciudad de México, México. pp. 415-417.

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