Noteworthy records of the Mexican hairy porcupine (*Coendou mexicanus*) in an urban protected natural area in southeastern Mexico

The Erethizontidae comprises arboreal rodents covered with spines. It originated in the New World, with 15 species of porcupines in three genera from the American Continent (Voss et al. 2013). The genus *Chaetomys* (Gray 1843, *C. subspinosus*) occurs in fragments of the Atlantic coastal lowlands and mountains of southeastern Brazil (Catzeflis et al. 2017), *Erethizon* (Cuvier 1823; *E. dorsatum*) is restricted to cold and temperate forests of North America from Mexico to Canada (Emmons 2016), and *Coendou* (Voss 2011) has a wide continental distribution comprising 13 species (*C. bicolor*, *C. ichillus*, *C. insidiosus*, *C. melanurus*, *C. mexicanus*, *C. nycthemera*, *C. prehensilis*, *C. pruinosus*, *C. quichua*, *C. roosmalenorum*, *C. rufescens*, *C. spinosus*, and *C. vestitus*; Voss et al. 2013). Both *Echinoprocta* (Gray 1865) and *Sphiggurus* (Cuvier 1823) are synonyms of *Coendou* (Voss et al. 2013).

The Mexican hairy dwarf porcupine, *C. mexicanus* (Kerr, 1792), has the widest distribution on the American Continent. It occurs from the Mexican coasts (northeastern Tamaulipas and southern Guerrero) to northern Panama (except for the north, northeastern, and eastern Honduras, northeastern to southeastern Nicaragua, and northeastern Costa Rica; Vázquez et al. 2016). The species has been recorded from 0 to 3200 m asl (Cisneros-Palacios et al. 2015) and associated with different vegetation types, including tropical cloud (Cisneros-Palacios et al. 2015, Lira-Torres et al. 2014), tropical evergreen (Rangel-Negrín et al. 2014),

evergreen (Faller et al. 2005, Rodríguez-Macedo et al. 2014) and tropical and subtropical (Astiazarán-Azcarraga et al. 2020, Osorio-Rodríguez et al. 2021) forests, with a preference for habitats with dense and high vegetation cover (Osorio-Rodríguez et al. 2021).

Knowledge and studies about the Mexican dwarf hairy porcupine are scarce, and the available ecological information is the product of opportunistic records. From this information, it is inferred as a solitary, nocturnal, territorial, and arboreal mammal (Monterrubio-Rico et al. 2010). It is a herbivore (folivore and frugivore) that consumes tree bark and leaves, particularly of the genera *Brosimum*, *Cecropia*, *Ficus,* and *Inga* (Mertz 2003), and occasionally fruits such as mango (*Mangifera indica*) and vanilla tree (*Inga eriocarpa*; Monterrubio-Rico et al. 2010). Throughout its range, the main threat to the species is habitat degradation and destruction, although the species is thought to be relatively tolerant of anthropic perturbation and is assumed to live in altered forest or vegetation patches close to human settlements (Faller et al. 2005, Lorenzo et al. 2014). It is unknown if the species takes advantage of human-provided resources (such as food or space), and the status of its populations in the wild is currently unknown. The species is categorized as Least Concern by the IUCN (2022) but as Endangered in Mexico, Honduras, and El Salvador. In Belize, Guatemala, Nicaragua, and Panama, the species is not under any protection.

Our objective was to present and describe photographic evidence of three records of *Coendou mexicanus* obtained in August of 2021 in southeastern Mexico, specifically in the central mountain region of the Veracruz State. These records contribute to the spatial and temporal representation of the species in the region. We include recent unpublished local records of the species from biological information repositories (such as Naturalista: www.naturalista.mx, and GBIF: https://www.gbif.org/) to present the current distribution of the Mexican dwarf hairy porcupine more fully in the central region of Veracruz.

The three independent records described here are the partial results of an ongoing long-term camera-trap survey conducted in the Protected Natural Area of the ecological park "El Haya" (19°31'12.3336" N, 96°56'36.2076" W, 19.18 ha, Figure 1), located in the suburbs of the city of Xalapa-Enríquez. The vegetation comprises second-growth cloud forest, riparian vegetation, acahual, and savannah (Vázquez-Torres et al. 2010). The climate is warm temperate, and fully humid (*Cfm,* Kottek et al. 2006). A rainy season occurs from May to October, with a dry season from November to April. Mean annual temperature ranges between 18-24°C, and annual rainfall between 1100 and 1600 mm (INEGI 2005).

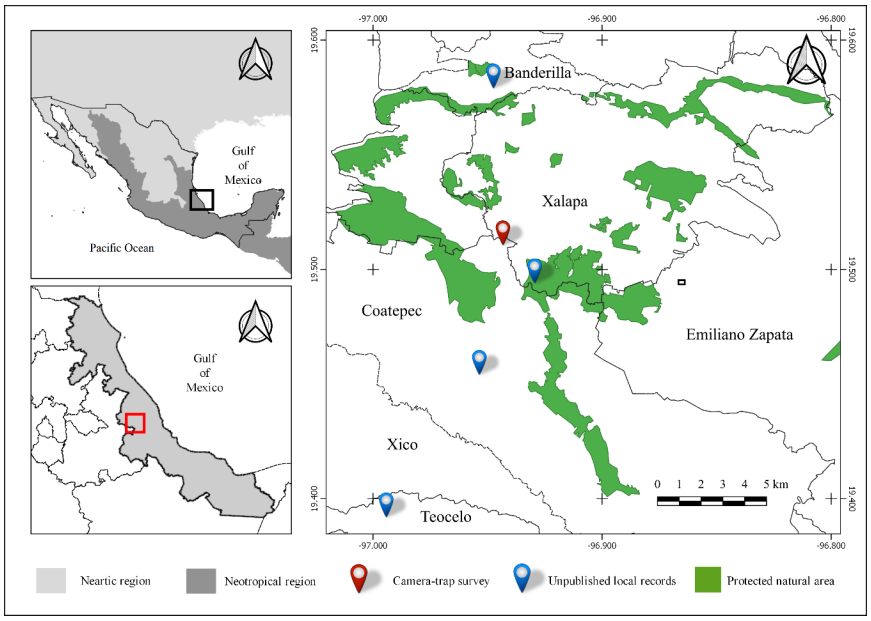

Figure 1. Distribution of recent sightings of *Coendou mexicanus* in the central mountainous region of Veracruz State, Mexico, including the locality of new records in the city of Xalapa-Enríquez.

A camera trap (Cuddeback ®, Long Range IR, Model E2, Wisconsin, USA) was installed 8.6 meters above ground level in a pipinque tree (*Carpinus tropicalis*; total tree height was 15 m, and the site was at 1373 m asl in elevation). The camera was programmed to document still images and 10 s videos. It was oriented towards olfactory attractants (vanilla and the perfume *Obsession*® Calvin Klein) and food rewards (an oatmeal-banana-vanilla mixture developed for omnivorous mammals and a sardine-tuna-chicken liver mixture developed for carnivores).

Independent records were obtained on different nights: 1) August 01st, at 00:14 h and 01:07 h; 2) August 18th, at 22:04 h; 3) August 23rd, at 21:05 h. The first record (Figure 2A) comprised a male with enlarged testicles, and a second picture taken less than an hour after the first is likely to be of the same individual, but we were unable to verify this (Figure 2B). It is unknown if the second (Figure 2C) and third records (Figure 2D) are of the same male specimen or two individuals.

The review of electronic biological repositories presented four independent records of Mexican hairy dwarf porcupines in the central mountainous region of Veracruz (Table 1), reported by inhabitants of different localities.

The historical records were obtained in cloud forest

remains near or in little-explored peri-urban areas (the species could be vulnerable to predators and human hunters; Marineros-Sánchez et al. 2018), in the central area of the state of Veracruz. Despite some records of direct observation (the arboreal and nocturnal habits of the species make direct observations difficult; Juárez-G 2005), these are the first published records obtained because of a systematic camera-trap survey. While reviewing this document, we obtained two additional records in the same location 14 and 15 months later (Figure 3). The genital area is not visible in these more recent images, and we cannot determine whether it is the same specimen(s) as those of 2021. All records occurred in the dark phase (between 19:36 h and 01:07 h), corresponding to the species' nocturnal behavior (Monterrubio-Rico et al. 2010). Given the low number of records, an activity pattern analysis was not possible.

Figure 2. Records of *Coendou mexicanus* in a pipinque tree (*Carpinus tropicalis*) in the ecological park "El Haya" (2021) in Xalapa-Enríquez. A and B. Male specimen. C & D. Specimen of unknown sex.

Table 1. Local records of *Coendou mexicanus* in the central mountain region of Veracruz State, Mexico.

Record type	Date	Locality	Latitude	Longitude	Vegetation	Reference
Direct observation	March 04, 2020	Emiliano Zapata, Veracruz, Mexico	19°33'51"N	96°49'47"W	Tropical deciduous forest	https://www.inaturalist.org/photos/62772296
	May 30, 2020	Banderilla, Veracruz, Mexico	19°35'18"N	96°56'50"W	Cloud forest	https://www.inaturalist.org/photos/76558942
	April 15, 2021	Coatepec, Veracruz, Mexico	19°27'49"N	96°57'13"W	Cloud forest	https://www.inaturalist.org/observations/74635206
	August 05, 2021	Xico, Veracruz, Mexico	19°24'05"N	96°59'39"W	Cloud forest	https://www.inaturalist.org/photos/148875828
Camera-trap records	August 01, 18 and 23, 2021 October 13 and November 03, 2022	Ecological Park "El Haya", Xalapa, Veracruz, Mexico	19°31'12.33"N	96°56'36.20"W	Cloud forest (secondary forest), riparian vegetation, acahual, and savannah	Terrestrial Vertebrate Photographic Collection «Alvar González Christen», Instituto de Investigaciones Biológicas, Universidad Veracruzana (Mammals catalog: IIB-UVMam 0102f, IIB-UVMam 0102fBis).

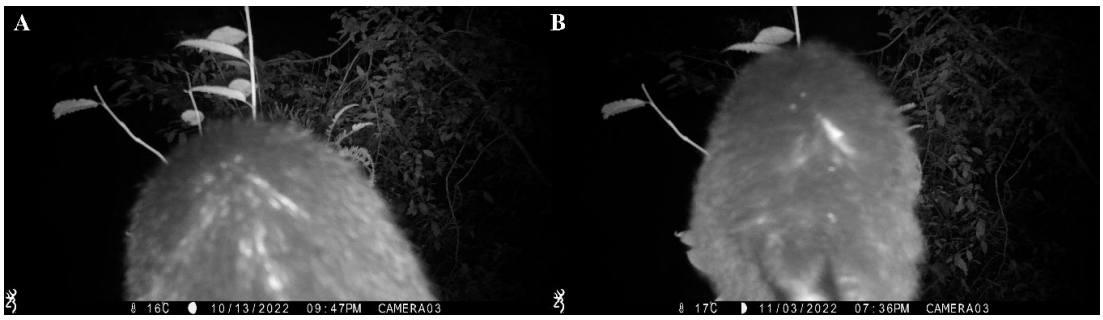

Figure 3. Records of *Coendou mexicanus* obtained 14 (A) and 15 (B) months later (2022) from a camera trap in the same pipinque tree (*Carpinus tropicalis*).

People who live near these parks should be encouraged to practice responsible coexistence with nature, protecting the fauna that inhabits the area and its surroundings, even though the records indicate that this species can inhabit disturbed areas (as previously reported by Faller-Menéndez et al. 2005). The obtained records support the existence of populations in the wild, although it is unknown if the records described here result from a disjunct distribution caused by the expansion of human settlements. It remains to be fully determined whether the environmental parameters of the central mountainous region of Veracruz can provide suitable habitats with optimum structural conditions for the species (such as coverage, surface, and distances to transformed areas; Lorenzo et al. 2014). The information provided here can be of value for the development of new research to further our knowledge of the biology and ecology of the Mexican hairy dwarf porcupine and to highlight the importance of their continued study.

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Álvaro José VILLAFAÑE-TRUJILLO[1], Mariano AVENDAÑO-DÍAZ[2], Nadia Pamela MONGE-PENSADO[3], Salvador MARTÍNEZ-OLIVARES[1], José Alberto LIZAMA-HERNÁNDEZ[1] and Christian Alejandro DELFÍN-ALFONSO[1]*

1. Laboratorio de Zoología, Instituto de Investigaciones Biológicas, Universidad Veracruzana University of Veracruz. Av. Luis Castelazo Ayala w/n, Col. Industrial Ánimas, zip code 91190. Xalapa de Enríquez, Veracruz, Mexico.

2. Instituto de Neuroetología, Universidad Veracruzana. Av. Luis Castelazo Ayala w/n, Col. Industrial Ánimas, zip code 91190. Xalapa de Enríquez, Veracruz, Mexico.

3. Facultad de Biología, Universidad Veracruzana. University Zone w/n, Col. Lomas del Estadio, zip code 91090. Xalapa de Enríquez, Veracruz, Mexico.

* Corresponding author: C. A. Delfín-Alfonso, E-mail: cada7305@gmail.com