

Behavioral patterns of a coordinated attack by a group of *Procyon lotor* on a bat in an urban coastal lagoon in Mexico

Patrones de comportamiento de un ataque coordinado de un grupo de *Procyon lotor* sobre un murciélago en una laguna costera urbana en México

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Ecological interactions between opportunistic mammals and bats emerge as a consequence of anthropogenic pressure and forced cohabitation in urban areas. During a wildlife diversity monitoring program in the Valle de las Garzas lagoon, Colima, Mexico, systematic camera-trapping was used to document interspecific interactions within a fragmented environment. Camera traps operated continuously for 24 h during 30 days and were programmed to record 20-s videos with a 1-s trigger interval; no bait or attractants were used. On November 20, 2025, at 18:16 h, a coordinated attack by three individuals of *Procyon lotor* on a fruit bat (*Artibeus* sp.) was recorded. The event lasted 20 seconds; following a failed flight attempt from a low perch (< 1 m), the bat fell to the ground, prompting two raccoons to actively return and initiate a simultaneous aggression, followed by a third individual. The camera was inspected 10 days after the event. Despite killing the specimen, the procyonids did not consume or further manipulate it. This represents the first record in Mexico of such coordinated attack behavior on a free-ranging fruit bat. The lack of consumption suggests the event reflects ecological dominance or territorial aggression resulting from high population density in urban wetlands, highlighting the remarkable behavioral plasticity of *P. lotor* under anthropogenic pressure.

Key words: *Artibeus*, camera-trapping, Colima, ecological dominance, raccoon, urban wetland.

Las interacciones ecológicas entre mamíferos oportunistas y quirópteros emergen frecuentemente como consecuencia de la presión antrópica y la cohabitación forzada en áreas urbanas. Durante un monitoreo de diversidad de mastofauna en la Laguna Valle de las Garzas, Colima, México, se empleó fototrampeo sistemático para documentar interacciones interespecíficas en un entorno fragmentado. Las cámaras operaron 24 hrs por 30 días continuos y fueron programadas para grabar videos de 20 s con intervalo de activación de 1 s; no se utilizó cebo ni atrayente. El 20 de noviembre de 2025, a las 18:16 h, se registró un ataque coordinado de tres individuos de *Procyon lotor* sobre un murciélago frugívoro (*Artibeus* sp.). El evento duró 20 segundos; tras un intento de vuelo fallido desde una percha a baja altura (< 1 m), el murciélago cayó al suelo, momento en el que dos mapaches regresaron de forma activa e iniciaron una agresión simultánea, seguidos por un tercer individuo. La cámara fue revisada 10 días después de que ocurrió el evento. A pesar de dar muerte al espécimen, los prociónidos no lo consumieron ni manipularon posteriormente. Este constituye el primer registro en México de este despliegue de conductas de ataque coordinado sobre un murciélago frugívoro en libertad. La ausencia de consumo sugiere que el evento responde a mecanismos de dominancia ecológica o agresión territorial derivados de la alta densidad poblacional en humedales urbanos, resaltando la notable plasticidad conductual de *P. lotor* ante la presión antropogénica.

Palabras clave: *Artibeus*, Colima, dominancia ecológica, fototrampeo, humedal urbano, mapache.

Interspecific ecological interactions and the spatio-temporal dynamics of species are critical factors for understanding community structure in fragmented ecosystems. In urbanized environments, the Northern

Raccoon (*Procyon lotor*) acts as an opportunistic mesocarnivore of the family Procyonidae, possessing a generalist diet and behavioral plasticity that allows it to exploit resources across natural, peri-urban, and urban

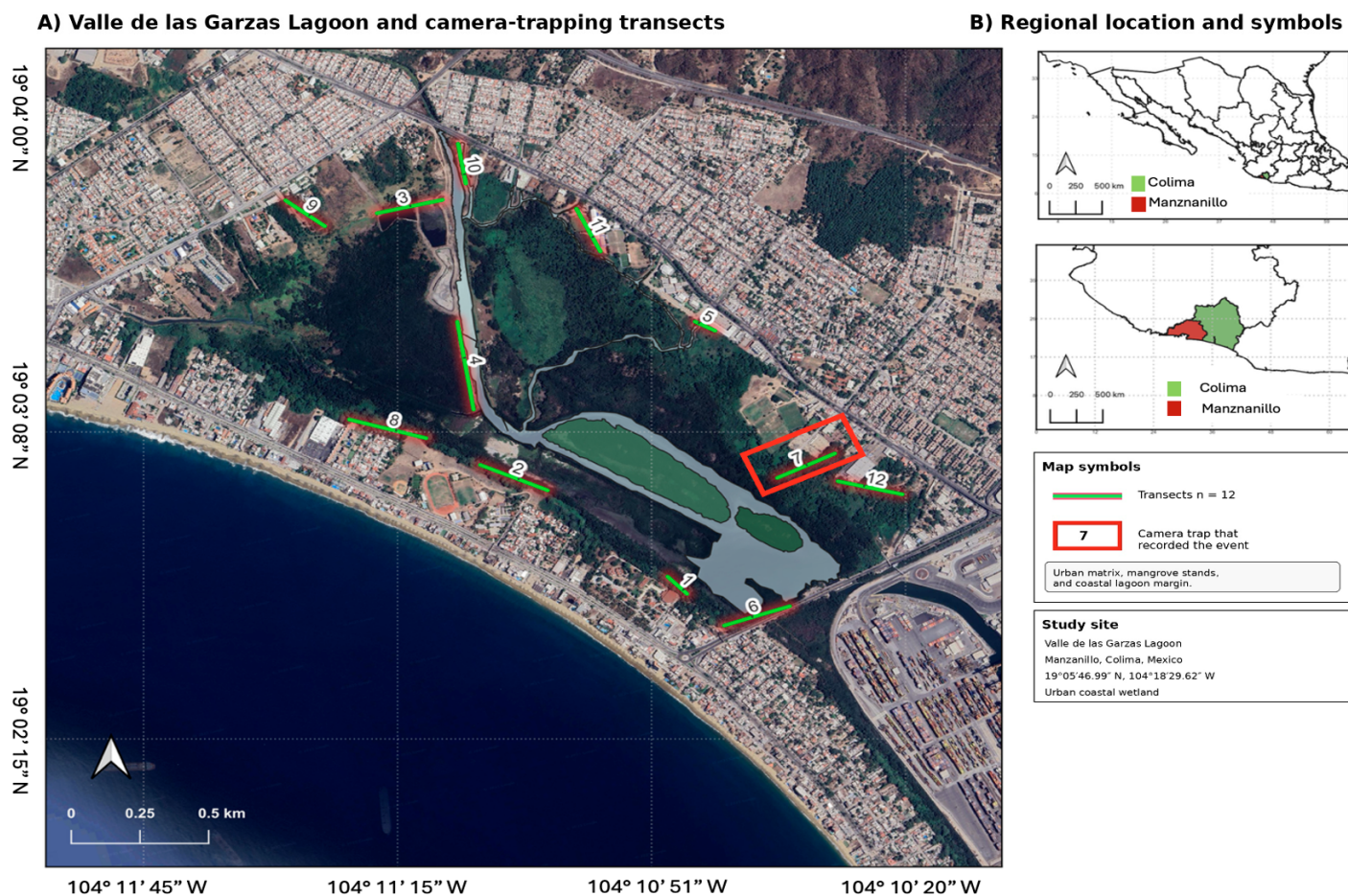


Figure 1. Geographic location of the Valle de las Garzas Lagoon in the municipality of Manzanillo, Colima, Mexico. The map shows the 12 camera-trapping transects and the camera station where the attack event was recorded.

landscapes (Guerrero *et al.* 2000; Wilson and Mittermeier 2009). This adaptive capacity can generate significant impacts on local fauna, altering mortality rates of various potential prey species (McAlpine *et al.* 2011).

Previous reports of interactions between raccoons and bats have been documented sporadically, primarily in the context of roosting sites. Early technical records described prehistoric raccoon predation on hibernating bats of the genus *Myotis* in Indiana, USA (Munson and Keith 1984). Subsequently, selective consumption of insectivorous bats affected by white-nose syndrome was reported in Canada, where raccoons discarded the wings and consumed only the body (McAlpine *et al.* 2011). Recently, similar behavior was documented in Central Europe, where *P. lotor*, as an invasive species, predaes on bats in hibernacula (Cichocki *et al.* 2021).

Despite these reports, there are information gaps regarding coordinated attacks in Neotropical environments, particularly outside of hibernation sites. The use of camera-trapping has facilitated the recording of atypical feeding behaviors in western Mexico, such as the predation of iguanas (*Ctenosaura pectinata*) by raccoons in areas where apex predators have been displaced (Ortega-Álvarez *et al.* 2025). The objective of this work is to describe the

behavioral patterns of a coordinated, non-predatory attack by a group of raccoons on a fruit bat in a highly anthropized coastal wetland of the Mexican Pacific.

The study was conducted at the Valle de las Garzas Lagoon (19°05'46.99" N, 104°18'29.62" W), located in the coastal zone of Manzanillo, Colima, Mexico, this Lagoon is a strategic ecosystem situated at sea level, where marine and terrestrial influences converge within the Tropical and Subtropical Dry Broadleaf Forests ecoregion (Olson *et al.* 2001). This landscape is shaped by an Aw climate, which corresponds to a tropical savanna environment with dry winters according to the updated Köppen-Geiger classification (Kottek *et al.* 2006; Rzedowski 2006). Under this classification, the lagoon experiences a warm and stable temperature range, with a mean annual temperature of 25.2 °C, monthly mean temperatures ranging from approximately 23.7 to 26.6 °C, and mean annual precipitation of 1,098 mm, concentrated mainly during the summer rainy season (Peel *et al.* 2007; Climate-Data.org 2026). This fundamental thermal condition sustains the complex dynamics of the aquatic and subaquatic vegetation found along this portion of the Mexican Pacific (Rzedowski 2006). However, is currently a fragmented wetland impacted by port and urban infrastructure in Manzanillo, Colima. The



Figure 2. Four-panel sequence of the coordinated attack by *Procyon lotor* on a fruit bat (*Artibeus* sp.) recorded by camera trap in the Valle de las Garzas Lagoon, Manzanillo, Colima, Mexico: a) the bat is perched on low vegetation while raccoons pass in front of the camera; b) the bat attempts to fly and falls near the raccoons; c) two raccoons return and initiate the attack; d) the bat remains on the ground after the raccoons abandon the site. Red boxes indicate raccoons and yellow boxes indicate the bat. The complete video record is available on YouTube (<https://www.youtube.com/watch?v=L3ubYu6f8IA>).

area serves as a receptor for runoff and treated greywater from the surrounding micro-basin (López-Rodríguez *et al.* 2025). Vegetation is dominated by mangroves (*Laguncularia racemosa* and *Rhizophora mangle*), with presence of tropical dry forest species including *Ficus microchlamys*, *Guazuma ulmifolia*, *Pithecellobium dulce* and *P. lanceolatum* (Jiménez-Ramón *et al.* 2016; Figure 1).

The record was obtained during a medium-sized mammal diversity monitoring program, twelve camera traps (Browning Model BTC-5PX-1080 Birmingham, Alabama) were deployed at 12 different sites within the lagoon at a height of 1 m. Each camera remained installed for 30 consecutive days before inspection, and the sampling effort was expressed as trap-days, where one trap-day corresponded to one 24-hr period in which one camera operated correctly and uninterrupted. Cameras operated continuously for 24 hr and were configured to record 20-s videos with a 1-s trigger interval (Chávez *et al.* 2013; Ambiente-CONAF 2021; Notario-Rincon *et al.* 2026). No food bait, olfactory lure, or other attractant was used at the camera-trapping stations.

To avoid overcounting consecutive detections, independent events were defined as records of the same species at the same camera station separated by at least 30 min, a criterion commonly applied in camera-trapping studies to reduce temporal pseudoreplication (Mosquera-Muñoz *et al.* 2014; Peral *et al.* 2022). Using this criterion, 14

independent raccoon capture events and one bat capture were recorded on the same transect before the attack, suggesting frequent use of this section of the wetland by raccoons.

We have a sampling effort of 360 trap-days. On November 20, 2025, at 18:16 hr, the attack sequence was recorded. Initially, a pair of raccoons passed in front of the camera without detecting a fruit bat (*Artibeus* sp.) perched on a shrub branch less than 1 m high. Upon sensing the proximity of the raccoons, the bat attempted to take flight but fell to the ground approximately 1 m from its original location.

Triggered by the falling movement, two raccoons immediately turned back aggressively; Figure 2 shows a characteristic “blurred eye” in one individual, confirming a swift and active turn toward the fallen specimen. These two individuals initiated a simultaneous and coordinated attack, joined seconds later by a third individual. The entire event lasted 20 seconds. The video can be found on the YouTube channel (<https://www.youtube.com/watch?v=L3ubYu6f8IA>).

After killing the bat, the three raccoons abandoned the site without engaging in any consumption or trophic manipulation (Figure 3). The camera was inspected on November 30, 2025, 10 days after the recorded event. During field inspection, the carcass was found at the site. A technical inspection confirmed that the specimen was



Figure 3. Final frame showing that the three raccoons abandoned the site after killing the bat, without subsequent consumption or trophic manipulation.

an adult of the genus *Artibeus*; however, sex could not be determined because diagnostic external reproductive characters were not evident in the recovered remains. No evident external injuries (such as tears or loss of limbs), reinforcing the non-consumptive nature of the attack.

The recorded event differs qualitatively from previous reports that occurred in different ecological contexts: 1) dense, mixed-growth forest in New Brunswick, Canada, where raccoons consumed bats affected by white-nose syndrome (McAlpine et al. 2011), and 2) a landscape composed of forests, wetlands, and agricultural areas in Central Europe, where invasive *P. lotor* preyed upon hibernating bats in underground roosts (Cichocki et al. 2021). In contrast, the event reported here occurred in a highly anthropized mangrove-dominated coastal lagoon of the Mexican Pacific, outside a hibernaculum and without subsequent consumption of the bat.

This rarely observed behavior may be linked to high raccoon population densities in urban wetlands. In these environments, competition for space and habituation to anthropogenic stimuli can exacerbate territorial aggression or aggressive exploratory responses to sudden movements by other species. The simultaneous participation of multiple individuals suggests social complexity in the attack patterns of *P. lotor* that had not been previously described for interactions with bats in the Neotropics.

In conclusion, this record evidences the remarkable behavioral plasticity of the raccoon in the Mexican Pacific. The described interaction highlights how anthropogenic

pressure in coastal wetlands alters traditional interactions between mesocarnivores and bats, promoting aggressive behaviors that do not necessarily serve a trophic function but rather a reaffirmation of dominance within the urban ecosystem.

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