

New record of jaguar, *Panthera onca*, in central Colima state, México

Nuevo registro de jaguar, *Panthera onca*, para el centro del estado de Colima, México

EDGAR ADRIÁN GÓMEZ-DEL CASTILLO¹, CARLOS ALBERTO HERNÁNDEZ-JIMÉNEZ², AND HELIOT ZARZA^{3*}

¹Holcim, Planta Tecomán. Km 1.5 Carretera a Caleras, C. P. 28930, Tecomán. Colima, México. E-mail: dirección@fauno.com.mx (EA-G).

²Laboratorio de Sistemática y Conservación de Vertebrados, Facultad de Ciencias Biológicas, Benemérita Universidad Autónoma de Puebla, C. U. Boulevard Valsequillo y Av. San Claudio s/n, Edif. 112, C. P. 72570, Puebla. Puebla, México. E-mail: acaltetepon22@gmail.com (CAH-J).

³Departamento de Ciencias Ambientales, DCBS, Universidad Autónoma Metropolitana Unidad Lerma. Av. de las Garzas 10, El Panteón, C. P. 52005, Lerma de Villada. Estado de México. México. E-mail: h.zarza@correo.ler.uam.mx (HZ).

*Corresponding author

The jaguar (*Panthera onca*) is an endangered species due to habitat loss and illegal hunting throughout its range. In the state of Colima, México, the latest sightings date back to the late 1960s. Here we report a new record for the center of the state. As part of a study to evaluate the diversity of mammals in the buffer area of the Holcim Cement Plant in Tecomán, Colima, 12 camera traps were installed on trees at a height of approximately 50 cm from the ground along trails, separated by 500 m between each other; traps operated 24 hr, 7 days a week between October 2019 and May 2023. After a sampling effort of 16,056 camera-days, 1 adult male jaguar was captured in a low deciduous forest in the town of Caleras on 29 March 2023. The record reported here confirms the presence of jaguars in central Colima. This record is located 50 km south of the previous report of the species for the state in 1969. Sampling in the conserved and buffer areas in the state of Colima is necessary to evaluate the conservation status of the jaguar and identify potential ecological corridors in the state and at the regional level.

Key words: Camera traps; Colima; Felidae; jaguar; new record; Tecomán.

El jaguar (*Panthera onca*) es una especie en peligro de extinción debido a la pérdida de hábitat y la cacería ilegal a lo largo de su rango de distribución. Para el estado de Colima, México, los últimos avistamientos datan de finales de la década de 1960. Aquí presentamos un nuevo registro para el centro del estado. Como parte de un estudio de evaluación de la diversidad de mamíferos en el área de amortiguamiento de la Planta de Cemento Holcim de Tecomán, Colima, se colocaron 12 trampas cámara en árboles a una altura aproximada de 50 cm del suelo en senderos, separadas entre cada una 500 m, permaneciendo activas 24 hr, los 7 días de la semana entre octubre de 2019 y mayo de 2023. Después de un esfuerzo de muestreo de 16,056 días-cámara, el 29 marzo de 2023, se tomó un video de un jaguar macho adulto en el interior de una selva baja caducifolia en la localidad de Caleras. Confirmamos la presencia de jaguar para el centro de Colima. Este registro se ubica a 50 km al sur del último reporte de la especie para el estado, en 1969. Son necesarios los muestreos en las áreas conservadas y de amortiguamiento en el estado de Colima para evaluar el estado de conservación del jaguar e identificar potenciales corredores ecológicos en la entidad y regionalmente.

Palabras clave: Colima; Felidae; jaguar; nuevo registro; Tecomán; trampas cámara.

© 2025 Asociación Mexicana de Mastozoología, www.mastozoologiamexicana.org

The jaguar (*Panthera onca* Linnaeus, 1758) is the largest solitary feline in the Americas, distributed from northern México to northern Argentina, thriving in diverse environments, from tropical forests to semi-desert environments (Quigley *et al.* 2017). Jaguar populations have declined throughout its range due to habitat loss and fragmentation, declining prey abundance, poaching, illegal trade, and conflicts arising from the coexistence between humans and jaguars (Ripple *et al.* 2014). Due to the problems facing this species, it is listed as "Near Threatened" by the International Union for Conservation of Nature (Quigley *et al.* 2017), while in México it is considered "Endangered" in the national environmental regulations (SEMARNAT 2010). In México,

the jaguar is distributed mainly in tropical and subtropical environments from Sonora to Chiapas on the Pacific slope and from Tamaulipas to the Yucatán Peninsula on the Gulf of México slope, at altitudes ranging from sea level to 3,000 m (de la Torre *et al.* 2018; Ceballos *et al.* 2021). For the Pacific slope, an area that includes from Sonora to Chiapas, multiple records of jaguars are now available, from the boom in photo-trapping studies and the contributions of citizen science, such as the iNaturalistaMEX platform. In contrast, for the central Pacific region, there is a lack of recent records for the state of Colima but not for the states of Nayarit (Luja *et al.* 2022), Jalisco (Moreno-Arzate *et al.* 2022), and Michoacán (Charre-Medellín *et al.* 2013, 2014, 2018; Del Moral-Álvarez *et al.* 2023).

The oldest record for the state of Colima dates back to 1948 and corresponds to a hunted specimen (19° 06' 41.73" N, 104° 06' 58.57" W; INaturalistMX), based on photographic evidence deposited in the Historical Archive of the state of Colima. The second set of records belong to specimens (skin and skull) captured at the town of El Terrero in 1968 and 1969 (19° 26' 41.17" N, 103° 56' 59.77" W) and deposited in the Vertebrate Collection of the Natural History Museum of Los Angeles County (LACM). The third record does not provide a date or locality, but only the geographic coordinates (19° 14' 35" N, 103° 43' 50" W; GBIF 2024). On the other hand, [Sánchez-Hernández et al. \(2016\)](#) recently reported the presence of jaguars in the Manantlán Biosphere Reserve, in the section corresponding to the limits of the state of Jalisco, suggesting that the species could be present in the area that corresponds to Colima.

The jaguar has been considered in various projects to establish priority conservation areas and biological corridors in México ([Rabinowitz and Zeller 2010](#); [Núñez 2011](#); [Rodríguez-Soto et al. 2011, 2013](#); [Ceballos et al. 2021](#)). At the regional level, some trials have been carried out where biological corridors are proposed for the states of Colima, Jalisco, Michoacán, and Nayarit ([Núñez 2011](#); [Ceballos et al. 2021](#)). For this reason, collecting information on the current distribution and abundance of the jaguar is essential to develop conservation and management strategies at different spatial scales ([Monroy-Vilchis et al. 2019](#)).

The study area is located in the buffer area of the Holcim Cement Plant (18° 59' 56.59" N; 103° 52' 06.63" W), in the Caleras hill, town of Caleras, north of the municipality of Tecmán, Colima, México. The area is part of the physiographic subprovince named Sierra de la Costa de Jalisco (Jalisco Coastal Mountain Range) and comprises a system of mountain ranges that runs east-north along the border of the municipality of Tecmán. The local climate is semi-dry, very warm and warm, with summer precipitation ([INEGI 2010](#)). The dominant vegetation is low deciduous forest in a secondary succession stage ([Arévalo et al. 2016](#)).

Monitoring of medium-sized and large mammals was carried out from October 2019 to May 2023 using photo trapping. To this end, 12 camera traps of two different brands were installed: Bushnell (model 119717cw, Bushnell, USA) and Wosports (model G600, Haofan Technology Co., Hong Kong). The camera traps were affixed separately onto tree trunks at a height of approximately 50 cm from the ground and were set to capture one photo image and a 20-sec video per event, with a 1-minute pause after each recorded event. Traps were in operation 24 hr during the monitoring period. A single camera trap was installed per station; in turn, stations were located in trails and roads, with a separation of 500 m between them. Due to the weather conditions and the continuous use of the equipment, all camera traps were replaced with new ones after 2 years of field operation, before presenting any



Figure 1. Adult male jaguar, *Panthera onca*, recorded in Tecmán, Colima, México, in March 2023. Image from the video deposited in the Collection of Biological Photocollections; catalog number of the video: IBUNAM-CFB-80678.

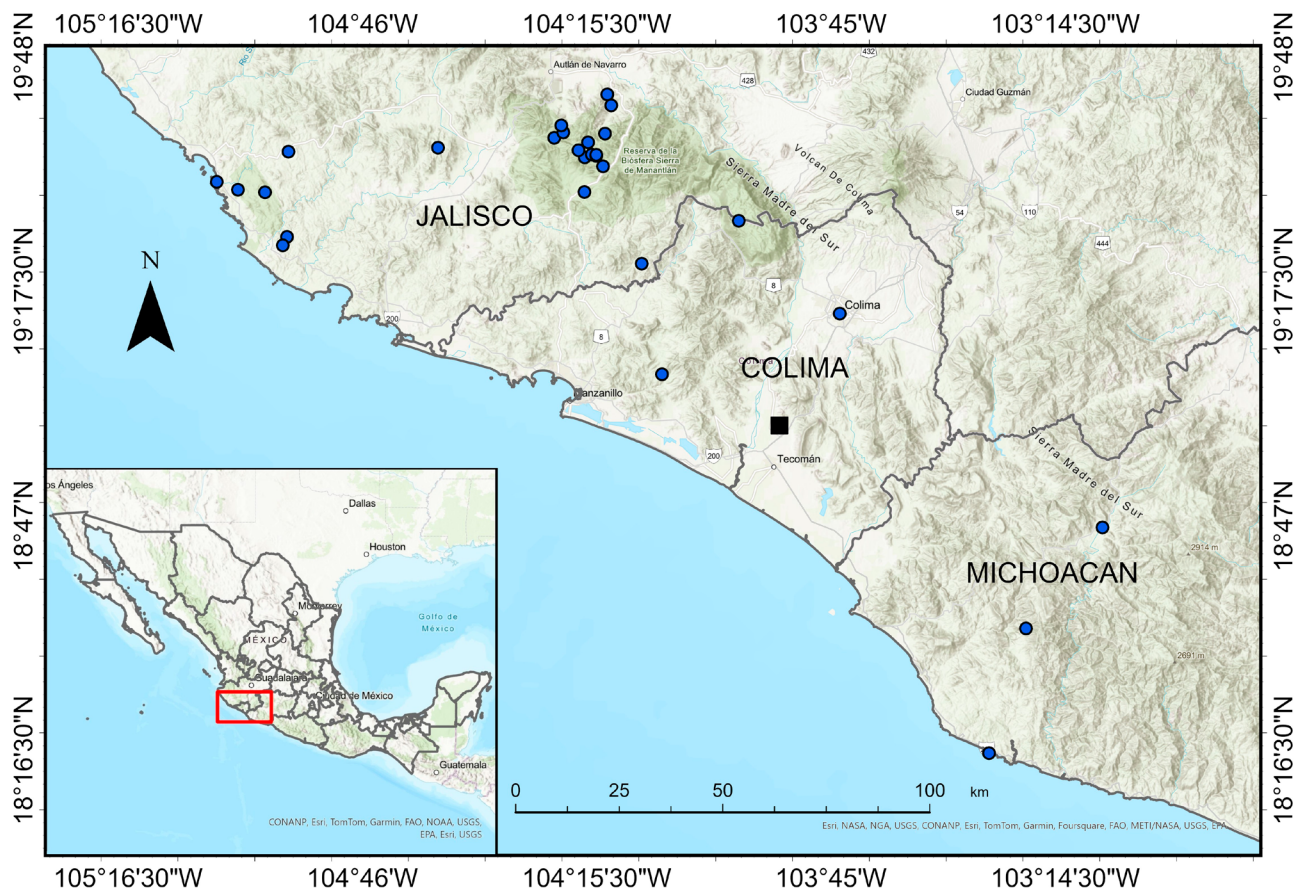


Figure 2. Historical (blue dots) and current record (this study, black square) of jaguar, *Panthera onca*, in the states of Jalisco, Colima and Michoacán, México.

operation issues, aiming not to interrupt the sampling.

As part of the database search, we surveyed the Global Biodiversity Information Facility database platforms (GBIF 2024), the Specimen Records of the National Biodiversity Information System (CONABIO 2024), and iNaturalistaMX (iNaturalistaMX 2024). Jaguar records were reviewed for the state of Colima, and none were found for the municipality of Tecmán, nor for the nearby municipalities of Armería and Coquimatlán.

A total sampling effort of 16,056 trap-days was carried out considering the 12 camera trap stations; it returned an updated record of jaguar for the central part of the state of Colima. On 29 March 2023 at 09:29 hr, 1 adult male jaguar was recorded ($18^{\circ} 59' 57.75''$ N, $103^{\circ} 51' 35.61''$ W, 595 m) walking along a path that crosses a patch of low deciduous forest (Figure 1). The video was deposited in the Collection of Biological Photocollection of the Institute of Biology, UNAM, with the catalog number IBUNAM-CFB-80678. This was the only record of the specimen and the species over the 44 months of monitoring.

The camera trap that recorded the jaguar also captured photographs and videos of several mammal species reported as prey of the jaguar, including white-tailed deer (*Odocoileus virginianus*), white-nosed coati (*Nasua*

narica), and collared peccary (*Pecari tajacu*). Additionally, the presence of other species of carnivores, such as coyote (*Canis latrans*), puma (*Puma concolor*), and ocelot (*Leopardus pardalis*), was documented.

This record is the first evidence of jaguars for the center of the state of Colima 50 years after it was last reported in the entity. The record reported here is located 29 km east of the jaguar record reported in 1948 (Leopold 1959) and 50 km south of the records in 1968 and 1969, located in the Manantlán Biosphere Reserve, state of Colima (GBIF 2024). Other nearby records include one for the state of Michoacán, 74 km southeast of jaguar records in Coalcomán (Brand 1961) and 130 km southeast of the records in Arteaga reported in 2010 (Charre-Medellín et al. 2013; Figure 2).

This latest jaguar record underscores the need to conduct additional studies on this species to know its current distribution and the conservation status of its populations in the state of Colima. This state has 5 federal protected natural areas: Manantlán Biosphere Reserve, El Jabalí Flora and Fauna Protection Area, La Huerta Natural Resources Protection Area, Nevado de Colima Volcano National Park and the Canoas Flora and Fauna Protection Area. Together, these areas protect 4.1 % (22,483 ha) of the state's surface, with a particular focus on temperate forest

conservation (CONABIO 2016), which is not necessarily the optimum habitat for the jaguar. It is recommended to promote studies in conserved tropical environments and their remnants, as well as in areas subjected to conservation schemes, such as Wildlife Management Units, Areas Voluntarily Dedicated for Conservation, and areas subject to Payment for Environmental Services. By maintaining conserved environments, these areas can potentially function as biological corridors between the neighboring states of Michoacán and Jalisco, which still maintain relatively well-preserved forest areas in their mountain ranges and thus facilitate the movement of jaguars along the Pacific coast.

Acknowledgements

We are grateful to Holcim Mexico, Tecomán Plant, for the facilities granted during the course of this study. We would like to thank F. Maldonado, I. Zuñiga, A. Martinez, and O. Fuentes for their logistical support. We are also grateful for the support provided by the residents and local authorities for its execution, and to the anonymous reviewers, whose comments improved this note. M. E. Sánchez-Salazar translated the manuscript into English.

Literature cited

- ARÉVALO, G. G., M. G. RODRÍGUEZ-CAMARILLO, AND A. G. MIRANDA M. 2016. Descripción de los principales tipos de vegetación. Pp. 116-131 in La Biodiversidad en Colima. Estudio de Estado (Cruz, A., et al., eds.). Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. México City, México.
- BRAND, D. 1961. Coalcomán and Motines del Oro. An ex-distrito of Michoacán, México. The Hague: Martinus Nijhoff. Institute of Latin American Studies. University of Texas. Texas, U. S. A.
- CEBALLOS, G., ET AL. 2021. Jaguar distribution, biological corridors and protected areas in Mexico: from science to public policies. *Landscape Ecology* 36:3287–3309.
- CHARRE-MEDELLÍN, J. F., ET AL. 2013. First records of jaguar (*Panthera onca*) from the state of Michoacán, Mexico. *The Southwestern Naturalist* 58:264-268.
- CHARRE-MEDELLÍN, J. F., T. C. MONTECUBIO-RICO, AND D. GUIDO-LEMUS. 2014. Nuevo registro de jaguar (*Panthera onca*), en el centro occidente de México. *Revista Mexicana de Biodiversidad* 85:1295-1299.
- CHARRE-MEDELLÍN, J. F., ET AL. 2018. Jaguar in the Tepalcatepec basin in central-western Michoacán, México. *Therya* 9:191-194.
- COMISIÓN NACIONAL PARA EL CONOCIMIENTO Y USO DE LA BIODIVERSIDAD (CONABIO). 2016. La Biodiversidad en Colima: Estudio de Estado. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. México City, México.
- COMISIÓN NACIONAL PARA EL CONOCIMIENTO Y USO DE LA BIODIVERSIDAD (CONABIO). 2024. Sistema Nacional de Información sobre Biodiversidad. Registros de ejemplares. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. México City, México.
- DE LA TORRE, J. A., ET AL. 2018. The jaguar's spots are darker than they appear: assessing the global conservation status of the jaguar *Panthera onca*. *Oryx* 52:300-315.
- DEL MORAL-ÁLVAREZ, M., M. A. ORTEGA-HUERTA, AND R. NÚÑEZ. 2023. Threatened habitats of carnivores: identifying conservation areas in Michoacán, México. *Conservation* 3:247-276.
- GLOBAL BIODIVERSITY INFORMATION FACILITY (GBIF). 2024. GBIF Occurrence Download <https://doi.org/10.15468/dl.56mrzm>. Accessed on August 8, 2024.
- INATURALISTAMX. 2024. Jaguar, *Panthera onca*, en Colima. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad. Available in: https://mexico.inaturalist.org/observations?place_id=7255&subview=map&taxon_id=41970. Accessed on August 9, 2024.
- INSTITUTO NACIONAL DE ESTADÍSTICA, GEOGRAFÍA E INFORMÁTICA (INEGI). 2010. Compendio de información geográfica municipal de los Estados Unidos Mexicanos Tecomán, Colima clave geoestadística 06009. Instituto Nacional de Estadística y Geografía. Aguascalientes, México.
- LEOPOLD, A. 1959. Wildlife of Mexico. University of California Press. Berkeley, U. S. A.
- LUJA, V. H., ET AL. 2022. Jaguars in the matrix: population, prey abundance and land-cover change in a fragmented landscape in western Mexico. *Oryx* 56:546-554.
- MONROY-VILCHIS, O., Z. ZARCO-GONZÁLEZ, AND M. M. ZARCO-GONZÁLEZ. 2019. Potential distribution and areas for conservation of four wild felid species in Mexico: conservation planning. *Mammalian Biology* 98:128-136.
- MORENO-ARZATE, E., ET AL. 2022. First record of jaguar (*Panthera onca*) and potential prey species in Sierra de Quila, Jalisco, Mexico. *Western North American Naturalist* 82:159-166.
- NÚÑEZ, R. 2011. A jaguar corridor in Western México. *Wild Felid Monitor* 4:20.
- QUIGLEY, H., ET AL. 2017. *Panthera onca* (errata version published in 2018). The IUCN Red List of Threatened Species 2017: e.T15953A123791436. <https://dx.doi.org/10.2305/IUCN.UK.2017-3.RLTS.T15953A50658693.en>. Accessed on September 1, 2024.
- RABINOWITZ, A., AND K. ZELLER. 2010. A range-wide model of landscape connectivity and conservation for the jaguar, *Panthera onca*. *Biological Conservation* 143:939-945.
- RIPPLE, W. J., ET AL. 2014. Status and ecological effects of the world's largest carnivores. *Science* 343:1241484.
- RODRÍGUEZ-SOTO, C., ET AL. 2011. Predicting potential distribution of the jaguar (*Panthera onca*) in Mexico: identification of priority areas for conservation. *Diversity and Distributions* 17:350-361.
- RODRÍGUEZ-SOTO, C., O. MONROY-VILCHIS, AND M. M. ZARCO-GONZÁLEZ. 2013. Corridors for jaguar (*Panthera onca*) in Mexico: conservation strategies. *Journal for Nature Conservation* 21:438-443.
- SÁNCHEZ-HERNÁNDEZ, C., ET AL. 2016. Mamíferos terrestres del

Estado de Colima. Pp. 221-242 *in* Riqueza y Conservación de los Mamíferos en México a Nivel Estatal (Briones-Salas, M., *et al.*, eds.). Instituto de Biología, Universidad Nacional Autónoma de México, Asociación Mexicana de Mastozoología A. C. and Universidad de Guanajuato. México City, México.

SECRETARÍA DEL MEDIO AMBIENTE Y RECURSOS NATURALES (SEMARNAT). 2010. Norma Oficial Mexicana NOM-059-SEMARNAT-2010, protección ambiental – especies nativas de México de flora y fauna silvestres – categorías de riesgo y especificaciones para su inclusión, exclusión o cambio – lista de especies de riesgo. Secretaría del Medio Ambiente y Recursos Naturales. México. 30 de diciembre de 2010. México City, México.

Associated editor: Cristian Kraker Castañeda.

Submitted: September 08, 2024; Reviewed: January 24, 2025.

Accepted: March 19, 2025; Published online: May 15, 2025.