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First contemporary record of jaguar at Morelos and the Sierra de Huautla Biosphere Reserve, Mexico

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The jaguar (Panthera onca) is the largest feline species in the Neotropics. It is considered Near Threatened by the International Union for the Conservation of Nature (Caso et al. 2008) and is included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES; http://www.cites.org/esp/app/index.php). In Mexico the species is considered threatened (SEMARNAT 2010) and a conservation priority (SEMARNAT 2009). Recommended actions in developing conservation strategies for jaguars in Mexico are to generate biological and ecological information on the species and to understand societal perceptions of jaguars (SEMARNAT 2009). Therefore, documenting the presence of jaguars at new localities is relevant to the decision-making process for management of jaguars in the wild. Here we report the first confirmed contemporary record of jaguars in the Sierra de Huautla Biosphere Reserve and the Mexican state of Morelos. The Sierra de Huautla is also considered a terrestrial conservation priority region in Mexico (Arriaga et al. 2000) and is part of the Balsas River basin terrestrial ecoregion, internationally considered highly threatened and important for biological conservation (Olson et al. 1995).

In 2009, a research team coordinated by the first author commenced an intensive photo-trapping study to monitor the mammalian carnivore community of the Sierra de Huautla Biosphere Reserve. A total sampling effort of 6826 trap-days was accumulated, and in August 2014, sampling was also conducted in the El Limón de Cuauchichinola community lands of Tepalcingo municipality, Morelos State, within the limits of the reserve (Fig. 1). We used 22 digital-camera traps of various models: Wildview (models Extreme 4 and 5; Stealth Cam, LLC, Grand Prairie, TX); Cuddeback (models Capture and Expert; Non Typical, Inc., Park Falls, WI); and Moultrie (models D444 and DS80; EBSCO Industries, Inc., Alabaster, AL). All camera traps were located at least 500 m apart and at sites with conserved tropical dry forest vegetation. Camera traps were set 40–60 cm above the ground on trees near trails or creeks where carnivore sign was evident.

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Cameras were operational 24 h per day with a camera delay of 30 s to 1 min. We placed a perforated can of sardines with tomato sauce at all photo-trapping stations to increase the probability and number of photo records of resident carnivore individuals (J. Servín unpublished data).

On 8 August 2014 at 20:14, with a Moultrie D444 camera trap, we obtained a sequence of 3 photographs of an individual jaguar. This animal is possibly an adult because its body appears robust with a pattern of fully-developed rosettes, though its sex cannot be determined (Fig. 2). At the same photo-trapping station, we recorded white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), white-nosed coati (*Nasua narica*), raccoon (*Procyon lotor*), donkey (*Equus asinus*), and cow (*Bos taurus*). In the conserved tropical dry forest of the study area, the most common tree species are *Conzattia multiflora, Lysiloma divaricata*, *Jacaratia mexicana*, *Amphipterygium adstringens*, and different *Bursera* species (CONANP 2005).

These photos are the first confirmed contemporary evidence of jaguar presence in Morelos State and the Sierra de Huautla Biosphere Reserve. The record represents a geographical range extension of the species of >100 km into central Mexico. The nearest sites where jaguars have previously been recorded are in the municipality of Apaxtla, Guerrero State, near the Caracol Dam (CONABIO 2010), 130 km southeast of our study site, and in the Sierra de Nanchititla Nature Reserve in Mexico State (Monroy-Vilchis et al. 2008), some 145 km west of our site record.

Archeological excavations have confirmed jaguar bones at the Xochicalco archaeological site in Morelos State that date from the Epiclasic Period (700–900 BC; Corona-M. 2008); however, it is likely that these were animals brought to...
Xochicalco from other localities. There are no other contemporary records of the presence of this feline species in Morelos State, though the state has areas with ideal habitat where the probability that jaguars are present is high (Rodríguez-Soto et al. 2011). No previous studies of the mammalian fauna of Morelos State have reported the presence of jaguars (Davis and Russell 1954, Álvarez-Castañeda and López-Forment 1995, Sánchez-Hernández and Romero-Almaraz 1995, Álvarez-Castañeda 1996). More recently, Altamirano et al. (2009) reported the presence of 4 feline species at a site in Miacatlán in northwestern Morelos State but did not report the presence of jaguars.

There is increasing evidence that conservation actions implemented in the Sierra de Huautla Biosphere Reserve since it was established by presidential decree in 1999 have contributed to the maintenance of biodiversity and have even enabled an increase in or repopulation by species not previously recorded or considered extirpated from the area. Examples of such species are collared peccary (*Pecari tajacu*) and margay (*Leopardus wiedii*; Mason-Romo et al. 2008, Valenzuela-Galván et al. 2013). Furthermore, the conserved forest in the reserve is considered high-quality habitat for white-tailed deer, which occur there in high densities (Hernández-Silva et al. 2011). The white-tailed deer is a main prey species of the jaguar (Núñez et al. 2000); therefore, high prey density in the reserve may have encouraged the range extension of jaguars into central Mexico.

Further research is required to determine whether this record represents a dispersing individual or whether multiple jaguars could be using the reserve as a hunting site, which may lead to establishment of a resident population.

We thank all the people from the rural communities in and around the Sierra de

![Fig. 2. Sequential photographic record of jaguar (*Panthera onca*) in the tropical dry forest of the Sierra de Huautla Biosphere Reserve, Morelos State, Mexico.](image)
Huautla Biosphere Reserve, particularly the workers at the El Limón Biological Station and the ejidal authorities of El Limón de Cuauichinola community. We also acknowledge field assistance by several students of the Faculty of Biological Sciences, Universidad Autónoma del Estado de Morelos (UAEM), and the logistical support provided by CIByC-UAEM and by Giovanni Tonatiuh González, Marco Aurelio Meneses, Máximo Juárez, and René Gadea. Part of the fieldwork in this study contributes to the master’s thesis of FCC (CONACyT scholarship number 293429). Partial financial support granted to DVG was provided by Fondo de Consolidación-UAEM.

LITERATURE CITED


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