

A rare case of *Rhipicephalus microplus* (Acari: Ixodidae) infestation on a Black Howler Monkey (*Alouatta pigra*) (Primates: Atelidae) in Petén, Guatemala

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ABSTRACT: *Rhipicephalus microplus* is a globally significant one-host tick that primarily infests cattle. In the Neotropics, this species has been reported on various wild mammals—such as cervids, tapirs, rodents, bats, carnivores and primates—as well as occasionally from humans. Here we report a rare case of *R. microplus* infestation in a rescued black howler (*Alouatta pigra*) from Melchor de Mencos, Petén, Guatemala. This tick-host association, documented at the ARCAS Wildlife Rescue Centre, highlights the expanding host range of *R. microplus* and emphasises the importance of continued surveillance regarding its health consequences in wildlife, zoonotic potential, and host adaptability.

Keywords: Neotropical tick biodiversity, wildlife ticks, new host-parasite association, cattle ticks

Zoobank: <https://zoobank.org/4A6E3B91-51D5-4AA6-AC03-2C1DE75D5FA9>

Rhipicephalus microplus is a one-host tick, and it is by far the most common and economically important tick infesting cattle worldwide, due to the damages, it causes to the livestock industry in both tropical and subtropical regions (Estrada-Peña et al., 2022; Pereira et al., 2022). In the New World, *R. microplus* was introduced by the Europeans during the translations of infested cattle from the Old World; since then, this species is present in areas from sea level to around 2,800 m elevation, although with a higher prevalence in pastures below 1,500 m (Vecino Cortés et al., 2010; Düttmann et al., 2016; Rojas Zapata et al., 2022). In addition to cattle, other ungulates such as equids, goats, sheep, and pigs can also be parasitized by *R. microplus*. To a lesser extent, cats and dogs have been reported as occasional hosts (Guglielmone et al., 2021). In the Neotropics, it has also been recorded on various wild mammals- including deer, tapirs, lagomorphs, rodents, bats, free-living carnivora and primates- as well as humans (Labruna et al., 2005; Labruna and Guglielmone, 2009; Guglielmone and Robbins, 2018; Guglielmone et al., 2021; Bermúdez et al., 2022). These infestations often occur where wildlife shares pasture with livestock (Estrada-Peña et al., 2022).

Compared with other groups of mammals, tick parasitism in primates is an unusual event due to their arboreal habits, and for the grooming and removal of external parasites behaviour (Lima et al., 2023). There are reports of tick species infesting monkeys, mainly in Brazil, including *Amblyomma* species such as *A. geayi*, *A. cajennense*, *A. parkeri*, *A. aureolatum*, *A. ovale*, *A. dubitatum*, *A. longirostre*, *A. sculptum*, and, to a lesser extent, *Ixodes fuscipes*, the *Rhipicephalus sanguineus* complex and *R. microplus* (Zimmermann et al., 2018; Martins et al., 2021). Nevertheless, *Amblyomma romarioi* is the only species of tick currently associated with Neotropical primates (Martins et al., 2019).

Howler monkeys (*Alouatta*, family Atelidae) comprise ten species of Neotropical monkeys that have a distribution spanning several types of environments from southern Mexico to northern Argentina (Schneider and Sampaio, 2015). The black howler monkey, *Alouatta pigra*, is endemic to Mexico, Belize, and Guatemala (Vázquez-Domínguez et al., 2025). This species typically inhabits tropical forests but can also persist in degraded, fragmented, or human-altered environments such as agricultural and pasture lands (Van Belle and Estrada, 2006; Baumgarten and Williamson, 2007). In Guatemala, *A. pigra* is primarily found in lowland regions in the northern part of the country, with some occasional records from highland areas at elevations above 2,000 m (Baumgarten and Williamson, 2007). Here, we report the presence of *R. microplus* on a rescued black howler at the ARCAS Wildlife Rescue Centre in Petén, Guatemala. To our knowledge, this represents the first reported case of a tick species associated with *A. pigra*.

On 30 June 2020, a black howler monkey was found by the national police roaming near a road in the municipality of Melchor de Mencos. The animal was subsequently remitted to the rescue ARCAS Wildlife Rescue Centre in the Municipality of Flores, in the Department of Petén on 1 July 2020. Melchor de Mencos territory (Fig. 1) is at an altitude of 220 m above sea level, with a warm and humid climate, located in the tropical rain forest area of Peten; and is part of the Mayan Biosphere Reserve, the largest protected area in the country and one of the most important reservoirs of wildlife (CONAP, 2015).

The rescued howler was an adult male, weighing 8.3 kg, with no injuries or evident clinical symptoms. During physical examination upon arrival, several ticks were found. Ticks were collected and preserved in ethanol 70%; afterwards, ticks were identified using a stereo microscope

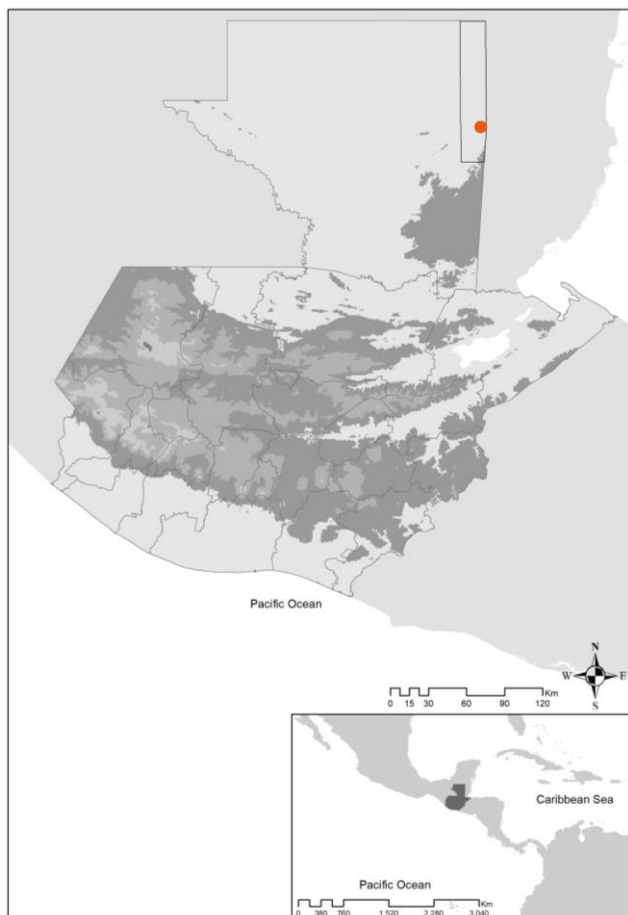


Figure 1. Melchor de Mencos territory.

(Laxco, LMC-BF117-03L1, California, United States). Ticks were identified following the taxonomic criteria of Bermúdez et al. (2018).

Three tick specimens were removed from a black howler monkey and morphologically identified as adult females of *R. microplus*. No larvae or nymphs were found. The identification was based on the following morphological characteristics, the ticks were engorged: in dorsal view, the basis of the capituli was hexagonal, and the palps were short (smaller than the hypostome). In the ventral view, the hypostome had four teeth, and the spurs on coxa I were short and distinct (Fig. 2).

Rhipicephalus microplus is widely distributed in Guatemala, and is primarily associated with cattle, although there are also reports of its occurrence in pigs, deer, sheep, dogs, horses and deer (IICA, 1988; Teglas et al., 2005; Álvarez-Robles et al., 2018). The IICA report (1988) includes records of *R. microplus* in Melchor de Mencos. This is the first report in Guatemala of *R. microplus* parasitising *A. pigra*. In previous studies in Brazil, adults of *R. microplus* have been reported on some *Alouatta* species (Zimmermann et al., 2018; Martins et al., 2021).

Previous records for Southern America mentioned *R. microplus* adults on *Alouatta puruensis* and *Alouatta guariba clamitans* (Martins et al., 2021). Cases of tick infestation on *Alouatta* monkeys appear to be more frequent in young individuals that are isolated from their group, abandoned, or injured- conditions often associated with stress, behavioural changes, and reduced grooming,

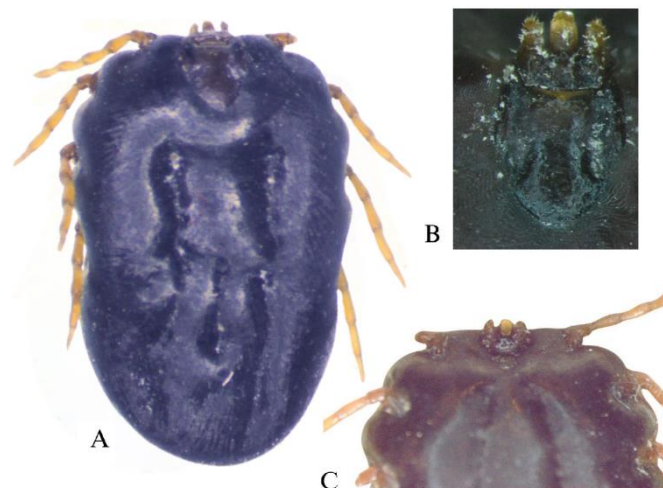


Figure 2. *Rhipicephalus microplus* (female) found on howler monkey. **A.** Dorsal view, **B.** Capitulum and scutum, **C.** Ventral view.

particularly in monkeys that reside permanently on the ground (Zimmermann et al., 2018; Lima et al., 2023). Nevertheless, the observation of this infestation in a healthy adult male host in this case suggests that the phenomenon may not solely be host-related, but could also be influenced by factors associated with the ticks themselves and environmental conditions.

Alouatta species are arboreal, but under some circumstances, they come to the ground, something seen in deforested landscapes where they use the anthropogenic matrix (Galán-Acedo et al., 2023). Fragmentation and habitat loss are the major threats to howler conservation (Klass et al., 2020), yet we still need a better understanding of how they affect the survival of these species. Despite some evidence indicating that howlers can adapt to fragmentation, and even show a positive response (Klass et al., 2020; Repullés and Galán-Acedo, 2025), there is also evidence of how the fragmentation could potentially be related to changes in behavior and the encounter of new threats like roadkill, hunting (Galán-Acedo et al., 2023), and emergence of new diseases including parasitic diseases. In 2020, two cases of *Tunga penetrans* (Siphonaptera) were reported in *Alouatta guariba clamitans*, and the researchers concluded that the infection was possible due to the proximity that howlers had with a human habitat and a possible increase in time on the ground (Schott et al., 2020).

In Peten, conservation efforts are challenged by the rapid changes in land use, including the expansion of pastures, habitat loss and fragmentation (CONAP, 2015). Howler monkeys are frequently seen outside the RBM in forest patches. These patches are sometimes surrounded by pasture areas. Over the last 20 years, cattle population has increased in this department (Rodas et al., 2021). This report shows a consequence of close interaction of the black howlers and cattle production areas with potential threat for the health of this species. Considering the history of this howler, this animal moved on the ground in some point. Such behaviour may be related to the habitat conditions in Melchor de Mencos, where cattle ranching surrounds, in many cases, forest fragments and animals

like this howler usually meet a habitat that is a potential source of cattle ticks. At least 56% of the land in Melchor de Mencos is forest, and 21% is used for crops and pastures (SCEP, 2023). The department of Peten has an estimated 1.8 million cattle (MAPA, 2023). According to the last cattle census, Melchor de Mencos holds 7.9% of the live animals of the department (INE, 2005).

The consequences of such cross-species parasite exposure for animal health, public health, and conservation remain unknown. Therefore, close monitoring of tick infestations in howler monkeys is essential to assess the frequency and potential impact of these events. Further research is also needed in Guatemala to investigate the spatial dynamics of black howler groups living in forest fragments near cattle pastures and savannas.

Authors' contributions

Irena Dione Méndez: Investigation, data curation, writing- original draft and editing, visualization. **Sergio Alejandro Morales:** Investigation, resources, writing-review and editing. **Jorge David Morán:** Funding acquisition, project administration, supervision. **Lillian Domínguez:** Data curation, methodology, writing-review & editing. **Sergio Eduardo Bermúdez:** Conceptualization, methodology, supervision, writing- review and editing.

Statement of ethics approval

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Conflict of interest

The authors declare they have no conflict of interest.

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