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Scientific Note

Amblyomma cajennense (Fabricius, 1787) (Ixodida: Ixodidae): human parasitism and the first record from the Acre State, Western Brazilian Amazon

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Abstract. The Cayenne tick, *Amblyomma cajennense* (Fabricius, 1787) (Ixodida: Ixodidae), parasitizes a range of vertebrate hosts, including humans, accidentally. Infestation by this species has important implications for public health, given that these ticks habitually bite humans and may act as the vectors of several pathogens. Here, we present a detailed case of human parasitism by *A. cajennense* and provide the first record of the occurrence of the species in the state of Acre, Brazil.

Keywords: Tick, Humans, Infestation, Lesion, Amazon region.

The scarcity of reports of the parasitism of humans by ticks in the Brazilian state of Acre may be at least partly related to the lack of knowledge of the local population on the potential health risks of exposure to these parasites. In the present study, we report the first case of the parasitism of a human by a tick in this state and provide the first record of the occurrence of *Amblyomma cajennense* (Fabricius, 1787) in Acre, in western Brazilian Amazon.

The Cayenne tick, *A. cajennense*, is known to parasitize a wide range of vertebrate hosts, including humans, accidentally (Guglielmone et al. 2006; Luz et al. 2020). This ixodid is part of a species complex, which includes five other taxa – *Amblyomma interandinum* Beati, Nava & Cáceres, 2014, *Amblyomma mixtum* Koch, 1844, *Amblyomma patinoi* Labruna, Nava & Beati, 2014, *Amblyomma sculptum* (Berlese, 1888), and *Amblyomma tonelliae* Nava, Beati & Labruna, 2014 (Nava et al. 2014; Martins et al. 2016). The ticks of this group represent an important concern for public health, given their habit of biting humans and the fact that they may act as the vectors of several different pathogens (Guglielmone et al. 2014; Martins et al. 2016; Labruna et al. 2017).

Amblyomma cajennense is endemic to the Amazon region and is well adapted to the humid conditions of this biome (Nava et al. 2014; Martins et al. 2016). This tick is reported infrequently infesting humans in Brazilian Amazon, which is considered an aggressive species (Martins et al. 2016; Costa et al. 2020; Luz et al. 2020). In the present study, we report on a case of human parasitism by *A. cajennense* and provide the first record of this species in the Brazilian state of Acre.

Case Report. A tick was found attached to a man's skin, one of four research team members, soon after visiting an area infested by ticks, the Brasiléia Centenary Park (BCP), in the municipality of Brasiléia, Acre State, Brazil. The BCP (11°00'45.5''S, 68°44'46.1''W) was visited on the April 30th, 2021 morning, during to collect tick specimens by the flannel drag method and by using CO_2 traps (Vieira et al. 2004).

This was soon after public complaints of the infestation of the park by ticks. The park was being revitalized when the work was suspended due to reports from the construction workers of the infestation of the site by ticks. Some of these workers had been bitten by the ticks and presented rashes and intense itching.

The research team visited the BCP to survey the site and collect ticks. The tick described here was found six hours after the visit, attached to the left inguinal region of the researcher (Fig. 1). After being photographed, the tick was removed using tweezers and was stored in 70% alcohol until its morphological identification, following Martins et al. (2016). The tick was not engorged and was identified as a male *A. cajennense* based on its morphological traits and the collecting locality (Fig. 2). The tick has not yet been deposited in any scientific collection and will be tested for pathogen by molecular analysis.

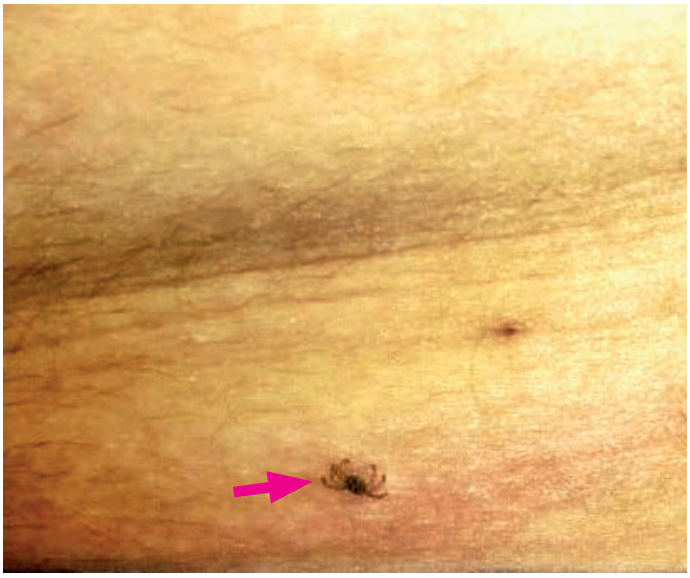

Figure 1. *Amblyomma cajennense* found partially attached to the skin of the left inguinal region of the researcher (arrow).

Primary dermatological alterations were observed following the removal of the tick, including a light erythematous-infiltrative lesion, with no clear demarcation of the surrounding normal skin, sensitivity,

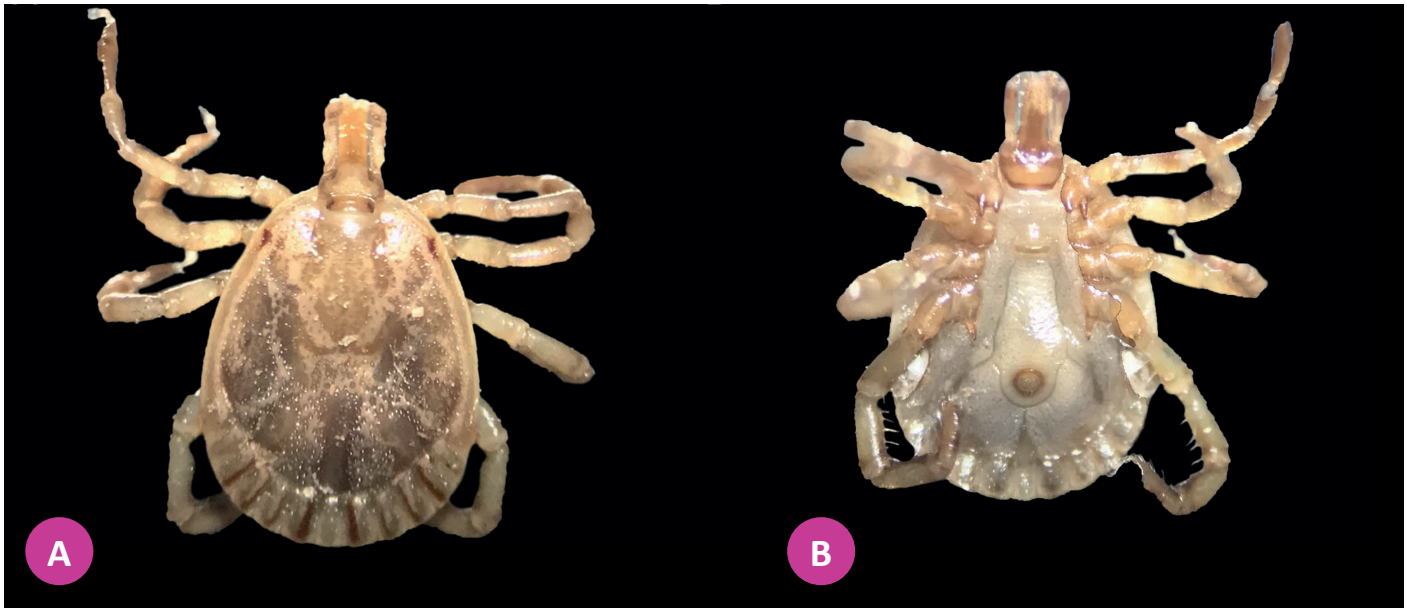

Figure 2. Male *Amblyomma cajennense* in the (A) dorsal, and (B) ventral views.

itchy papule, and latent pain (Fig. 3A). After two days (Fig. 3B), the site of the bite was still sensitive, painful, and itchy, now surrounded by an erythema. Two weeks later (Fig. 3C), the erythema, itching, and sensitivity persisted, and the bite area had formed a papule covering a vesicle, which resulted in a cutaneous eruption followed by the formation of a scab. After two months (Fig. 3D), the area had irregular alopecia with fibrous tissue.

Figure 3. Site of the bite of the Cayenne tick (*Amblyomma cajennense*) described in the present study (A) immediately after the removal of the tick, (B) two days later, (C) two weeks later, and (D) two months after the removal of the tick.

The present study provides the first detailed description of human parasitism by a male *A. cajennense*. These arthropods infest birds and mammals during their immature phases (Guglielmone & Robbins 2018), while the primary hosts of the adult include tapirs [*Tapirus terrestres* (Linnaeus, 1758)], capybaras (*Hydrochaeris hydrochaeris,* Linnaeus, 1766), horses (*Equus caballus,* Linnaeus, 1758), and anteaters, *Myrmecophaga tridactyla*, Linnaeus, 1758 (Aragão 1936; Martins et al. 2016).

Ticks infest humans opportunistically, and this parasite-host relationship is accidental. Even so, *A. cajennense* is an important parasite of humans in Brazil, where it is frequently linked to *Rickettsia amblyommatis*, which causes rickettsiosis, whose pathogenicity in humans is still poorly understood (Labruna et al. 2004; Martins et al. 2016; Pacheco et al. 2021).

Few studies have reported on the infestation of humans by ixodids in Brazilian Amazon (Guglielmone & Robbins 2018; Luz et al. 2020; Pacheco et al. 2021). Up to now, there have been no published reports of the parasitism in humans by ticks in Acre, so, as far as we know, this is the first documented occurrence of this phenomenon in the state.

Labruna et al. (2005) recorded *A. cajennense* parasitizing a human in Rondônia, a neighboring eastern Acre State. Labruna et al. (2004) isolated *R. amblyommatis* (denominated *Rickettsia amblyommii*) from free living *A. cajennense* collected in the municipality of Governador Jorge Teixeira, in Rondônia.

The case reported here was characterized by an extensive erythematous-infiltrative lesion and prolonged discomfort. Soon after removing the tick, the site of the bite had dermatological alterations, which evolved progressively. Tick bites can cause distinct cutaneous manifestations in humans, due not only to primary lesions related to the immunological response, toxicity, and inflammation of the skin caused by the penetration of the buccal apparatus of the tick but also secondary lesions, with cutaneous manifestations resulting from infections caused by etiological agents (Haddad Jr. et al. 2018).

The adoption of prophylactic protocols may reduce the risk of tick bites. These protocols include the use of closed shoes, long sleeves and long pants (which can be tucked into the footwear), the application of repellents, such as Permethrin, which can be applied over the whole of the body, in addition to the regular inspection of the skin and clothes both during and after contact with vegetation (Vieira et al. 2004; Meira et al. 2013; Brasil 2016).

The available data indicate that the ixodid fauna of the Brazilian state of Acre includes a total of 22 species (Tojal et al. 2020; 2021). The record of *A. cajennense*, presented here, brings this total to 23 species.

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Authors' contributions

Experiment setup and data collection: VLS, MSL, FEC, JROS; Tabulation, statistical analysis of data and creation of tables and figures: VLS and MSL; Identification of species and standardization of scientific names with their respective authors: TFM; Writing the text and standardizing the rules according to the journal: VLS; Text revision and addition of significant parts: VLS, MSL, FEC, JROS, TFM and JRLS.

Conflict of interest Statement

We declare that there is no conflict of interest.

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