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Ticks and Tick-borne Diseases

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Rickettsial infection in ticks (Acari: Ixodidae) from reptiles in the Colombian Caribbean

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ARTICLE INFO

Keywords:

Amblyomma dissimile

Rickettsia

Hosts

Ectoparasite

Colombia

ABSTRACT

Although more reptiles are illegally traded in Colombia than any other group of animals, for both local and international markets, little is known about ticks associated with reptiles or pathogens associated with these ticks. In this study, ticks were collected from reptiles in Magdalena, Cesar and La Guajira regions in northern Colombia, and identified morphologically using taxonomic keys and molecularly by sequencing of the *COI* gene. In addition, *Rickettsia* spp. were detected by PCR amplifying the *gltA*, *16S rRNA*, and *sca1* genes. Ticks were identified as *Amblyomma dissimile*, representing the first record for this species in 17 of the 26 species of reptiles sampled. Additionally, our data expand the distribution range for this tick in Colombia. *Rickettsia* spp. DNA was detected in 18 ticks (3.6%) from 16 reptiles. Sequence analyses indicated that most of the *Rickettsia* were members of the *R. monacensis* clade, most closely related to *Rickettsia* sp. strain Colombianensi. We detected one tick infected with a *Rickettsia* with 99% identity to *R. bellii*.

1. Introduction

Ticks are important vectors of helminths, protozoa, virus and bacteria (Nava et al., 2009). There are few tick infestation records in Colombia and most are from domestic animals; for reptiles, such records are only occasionally available, usually for common species such as *Boa constrictor* and *Iguana iguana* (Carrascal et al., 2009; Miranda et al., 2012; Verbel-Vergara et al., 2015).

Among tick-borne pathogens, bacteria of the genus *Rickettsia* (Rickettsiales: Rickettsiaceae) are of increasing importance in Colombia and Latin America (Witter et al., 2016). These Gram-negative coccobacilli can be transmitted by lice, fleas, mites, bedbugs, leeches, and even amoeba (Perlman et al., 2006). They are classified into four groups: the spotted fever group, the typhus group, the *Rickettsia bellii* group and the *Rickettsia canadensis* group (Parola et al., 2013). In Colombia, cases of spotted fever caused by *Rickettsia rickettsii* have been reported in endemic regions (Hidalgo et al., 2007, 2011; Gómez-Quintero et al., 2016); there is also evidence for seropositivity for *Rickettsia bellii* and ticks have been reported to be infected with new *Rickettsia* species of unknown pathogenicity (Miranda and Mattar, 2014).

The tick family Ixodidae contains the most important vectors for transmission of *Rickettsia* spp. Within this family, the genera *Ixodes* and

Amblyomma are the most important parasites of vertebrates in the Neotropics, among which 37 species parasitize reptiles (VOLTZIT, 2007). In Colombia, the greatest number of infestation records is for the species *Amblyomma dissimile*, a three-host tick which prefers to feed on reptiles or amphibians (Schumaker and Barros, 1994; Guglielmone et al., 2003), but has been recorded also on birds and mammals, including humans (Guglielmone and Nava, 2010; Scofield et al., 2011; Scott and Durden, 2015). In spite of this, it is considered of little economic importance.

There is relatively close contact between people and reptiles in Colombia, and more reptiles are illegally traded, in both local and international markets, than any other group of animals (Hernández and Linares, 2005; Arroyave et al., 2014b). However, there are few studies of *Rickettsia* in ticks associated with reptiles, with an important exception being the study by Miranda et al. (2012) of ticks feeding on *I. iguana* in the department of Córdoba. The objective of this study was to seek evidence of *Rickettsia* spp. DNA in ticks collected from reptiles in different locations of the Colombian Caribbean.

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<https://doi.org/10.1016/j.ttbdis.2018.02.003>

Received 5 May 2017; Received in revised form 31 January 2018; Accepted 2 February 2018
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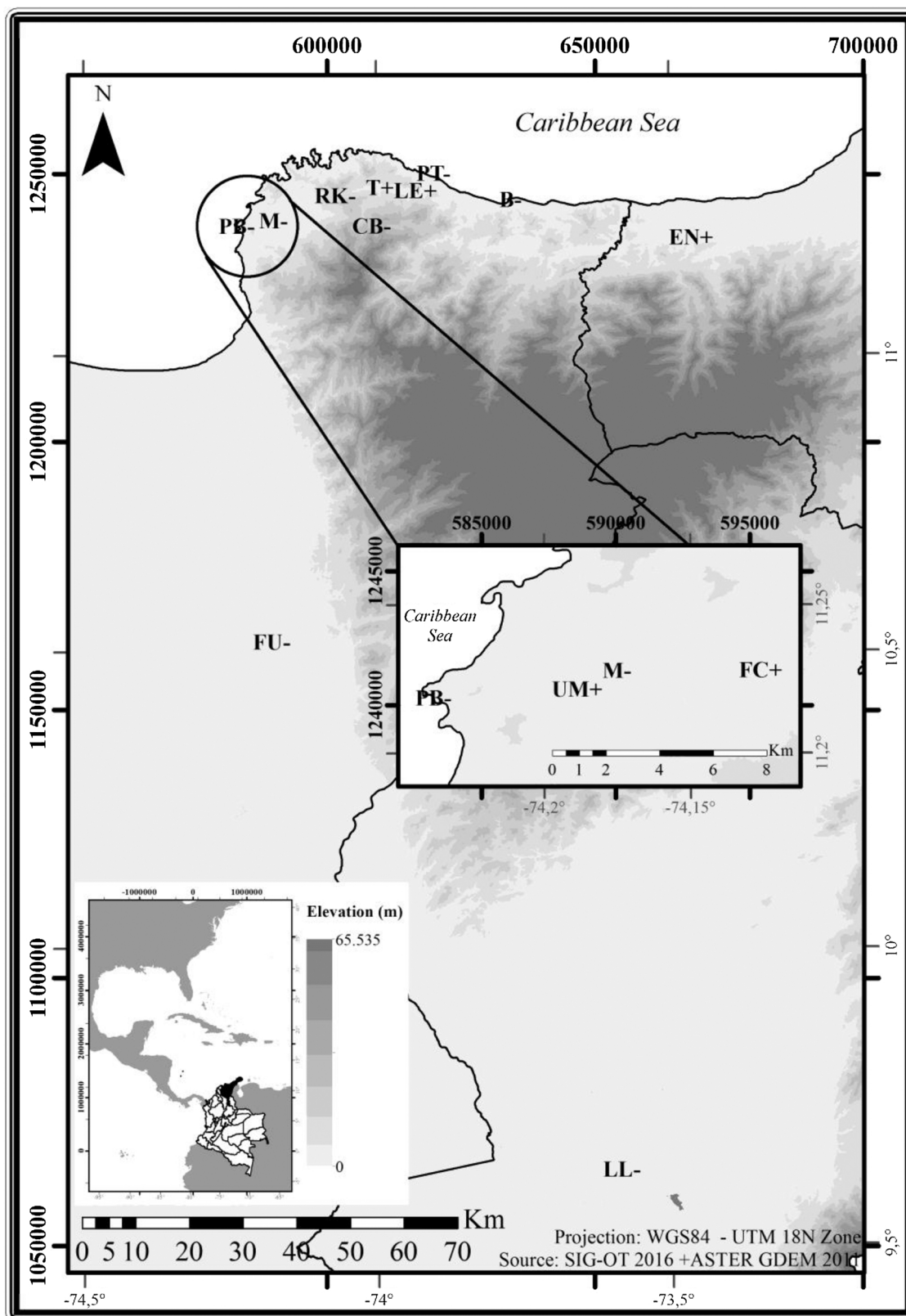


Fig. 1. Map of the sampled localities. UM: Universidad del Magdalena; CB: Casa blanca; LE: La Esmeralda; T: Tayronaca; M: Mamatoco; FC: Finca comanche; RK: Reserva Kalashe; PT: Parque Tayrona; LL: La Loma; B: Buritaca; PB: Playa Blanca; FU: Fundación; EN: Escuela la Naturaleza. Numbers on axis are projected coordinates (WGS84 and UTM 18N systems).

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