



Contents lists available at ScienceDirect

Ticks and Tick-borne Diseases

journal homepage: www.elsevier.com/locate/ttbdis

Original article

Contributions to the knowledge of hard ticks (Acari: Ixodidae) in Colombia

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ARTICLE INFO

Keywords:

Amblyomma mixtum
Molecular analyses
Neotropical region
Rhipicephalus sanguineus

ABSTRACT

The known tick fauna of Colombia includes 58 species (15 Argasidae and 43 Ixodidae). To add to the knowledge of the biology of ticks in Colombia, hard ticks (Ixodidae) were collected from domestic animals or vegetation during 2014–2016 in 10 of Colombia's Departments. Ticks were identified to species through morphological examinations. Taxonomic identification was confirmed for some specimens by molecular methods, including phylogenetic analyses inferred from three tick genes (cytochrome c oxidase, 16S rDNA, second internal transcribed spacer). A total of 1745 tick specimens encompassing 8 species were collected. Overall, 5 tick species were recorded on cattle [*Amblyomma dissimile*, *Amblyomma mixtum*, *Dermacentor nitens*, *Rhipicephalus microplus*, *Rhipicephalus sanguineus* sensu lato (s.l.)], 5 on dogs (*Amblyomma maculatum*, *Amblyomma ovale*, *Amblyomma varium*, *R. microplus*, *R. sanguineus* s.l.), 3 on horses (*A. mixtum*, *D. nitens*, *R. sanguineus* s.l.), 3 on donkeys (*A. mixtum*, *D. nitens*, *R. microplus*), 1 on pig (*D. nitens*), and 2 from vegetation (*A. mixtum*, *A. dissimile*). This included the first records of *A. mixtum* from two Colombian Departments, indicating that the distribution of this tick in Colombia may be broader than currently known. Phylogenetic analyses confirmed that *R. sanguineus* s.l. specimens from 8 Departments belong to the “tropical species”. Moreover, Colombian specimens of *A. maculatum* formed a large clade with GenBank sequences of *A. maculatum* and *A. triste*, although some Colombian specimens grouped with *A. maculatum* from the United States while others grouped with *A. triste* from Brazil. Significant polymorphisms were observed between specimens of *A. ovale* or *D. nitens*; for the former species, it is noteworthy that two distinct clades were observed. Our study provides new records for 8 tick species parasitizing domestic animals in Colombia, including species with veterinary and medical importance in the Neotropical region, such as *R. microplus*, *R. sanguineus*, *D. nitens*, *A. mixtum*, and *A. maculatum*. Noteworthy, we provide the first record of *A. varium* infesting a domestic mammal.

1. Introduction

The World's tick fauna currently includes 939 species of three families: Ixodidae (727 species), Argasidae (211 species) and Nuttalliellidae (1 species). Nearly one-fourth of these species are known to occur in the Neotropical region (Barros-Battesti et al., 2006; Hornok

et al., 2016; Labruna et al., 2016; Muñoz-Leal et al., 2016; Apanaskevich and Bermúdez, 2017; Ash et al., 2017; Muñoz-Leal et al., 2017; Chitimia-Dobler et al., 2017; Guo et al., 2017; Nava et al., 2017). Broad-scale studies on ticks occurring in Colombia have been scarce (Osorno-Mesa, 1940; López and Parra, 1985). According to the last review of Neotropical ticks (Guglielmone et al., 2003), the following

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<http://dx.doi.org/10.1016/j.ttbdis.2017.10.008>

Received 24 July 2017; Received in revised form 5 October 2017; Accepted 11 October 2017
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Table 1
Localities in Colombia where ticks were collected in the present study.

Locality number ^a	Municipality	Department
1	Leticia	Amazonas
2	Medellín	Antioquia
3	Arauca	Arauca
4	Fortul	Arauca
5	Saravena	Arauca
6	San Jacinto	Bolívar
7	Dorada	Caldas
8	Neira	Caldas
9	Norcasia	Caldas
10	Nunchía	Casanare
11	Yopal	Casanare
12	Puerto Salgar	Cundinamarca
13	San Juan de Arama	Meta
14	Ibagué	Tolima
15	Saldaña	Tolima
16	Cali	Valle del Cauca
17	Restrepo	Valle del Cauca

tick species are known to occur in Colombia: Argasidae (15 species) – *Antricola mexicanus* Hoffmann, 1958, *Argas magnus* Neumann, 1896, *Argas miniatus* Koch, 1844, *Ornithodoros azteci* Matheson, 1935, *Ornithodoros brodyi* Matheson, 1935, *Ornithodoros furcosus* Neumann, 1908, *Ornithodoros hasei* (Schulzei, 1935), *Ornithodoros marinkellei* Kohls, Clifford and Jones, 1969, *Ornithodoros marmosae* Jones and Clifford, 1972, *Ornithodoros peropteryx* Kohls, Clifford and Jones 1969, *Ornithodoros puertoricensis* Fox, 1947, *Ornithodoros rossi* Kohls, Sonenshine and Clifford, 1965, *Ornithodoros rudis* Karsch, 1880, *Ornithodoros talaje* (Guérin-Méneville, 1849), and *Ornithodoros yumatensis* Cooley and Kohls, 1941; Ixodidae (38 species): *Amblyomma auricularium* (Conil, 1878), *Amblyomma cajennense* (Fabricius, 1787), *Amblyomma calcaratum* Neumann, 1899, *Amblyomma coelebs* Neumann, 1899, *Amblyomma crassum* Robinson, 1926, *Amblyomma dissimile* Koch, 1844, *Amblyomma geayi* Neumann, 1899, *Amblyomma humerale* Koch, 1844, *Amblyomma longirostre* (Koch, 1844), *Amblyomma maculatum* Koch, 1844, *Amblyomma multipunctum* Neumann, 1899, *Amblyomma naponense* (Packard, 1869), *Amblyomma neumanni* Ribaga, 1902, *Amblyomma no-*

^a localities indicated in.

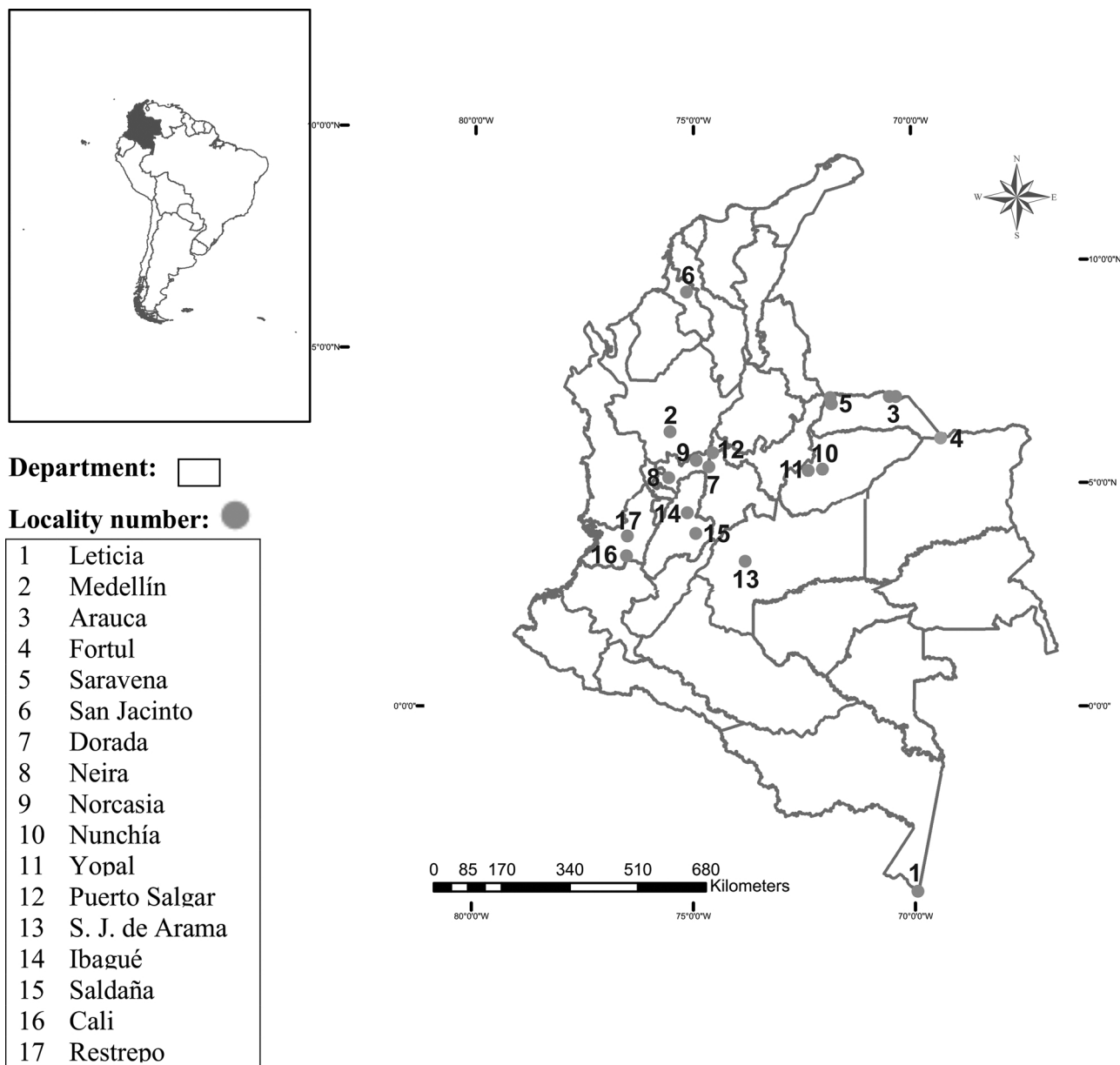


Fig. 1. Geopolitical map of Colombia showing the localities where ticks (Acari: Ixodidae) were collected during the present study.

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