



Relationships of South American marsupials (Didelphimorphia, Microbiotheria and Paucituberculata) and hard ticks (Acari: Ixodidae) with distribution of four species of *Ixodes*

ALBERTO A. GUGLIELMONE¹, SANTIAGO NAVA¹ & M. MÓNICA DÍAZ²

¹Instituto Nacional de Tecnología Agropecuaria, Estación Experimental Agropecuaria Rafaela and Consejo Nacional de Investigaciones Científicas y Técnicas, CC 22, CP 2300 Rafaela, Santa Fe, Argentina.

E-mail: aguglielmone@rafaela.inta.gov.ar, snava@rafaela.inta.gov.ar

²PIDBA (Programa de Investigaciones de Biodiversidad Argentina). Facultad de Ciencias Naturales e IML-Universidad Nacional de Tucumán; PCMA (Programa de Conservación de los Murciélagos de Argentina), Consejo Nacional de Investigaciones Científicas y Técnicas, Miguel Lillo 255, 4000, Tucumán, Argentina. E-mail: mmonicadiaz@arnetbiz.com.ar

Abstract

Historical information shows that South American marsupials are irrelevant hosts for South American hard ticks (Ixodidae Murray) of the genera *Haemaphysalis* Koch, *Rhipicephalus* Koch and *Dermacentor* Koch. Twenty two *Amblyomma* Koch species were occasionally found on Didelphimorphia Gill, but some records are doubtful (i.e., *A. dissimile* Koch, 1844) and only *A. fuscum* Neumann, 1907 appears to be a relevant parasite of this type of host. Twelve species of *Ixodes* Latreille were determined on these hosts, although one of them, *I. longiscutatus* Boero, 1944, is probably misidentified. Four species, *I. amarali* Fonseca, 1935b, *I. loricatus* Neumann, 1899, *I. luciae* Sènevet, 1940 and *I. venezuelensis* Kohls, 1953 are usual parasites of Didelphimorphia. These species (*I. venezuelensis* excluded) have adult ticks feeding mostly on Didelphidae Gray, and sub-adult ticks feeding mostly on Didelphidae and several species of sigmodontine rodents. All parasitic stages of *I. venezuelensis* were recorded from Didelphimorphia although rodents are also of importance for its life cycle. Records from marsupials and non-marsupial hosts show that *I. amarali* is established in eastern Brazil, and *I. venezuelensis* in Venezuela, Colombia, Panama and Costa Rica. The alleged southernmost record of *I. luciae* in Central Argentina was found to be erroneous and its southern limit is located in northwestern Argentina and its way northwards includes Bolivia, Peru, western Brazil, French Guiana, Surinam, Trinidad & Tobago, Panama, Guatemala, Belize and southern Mexico with unconfirmed but probably valid records for Ecuador, Colombia, Costa Rica, Nicaragua and Honduras. The distribution of *I. loricatus* has been historically considered to range from southern Argentina to southern Mexico but southernmost and northernmost records are now considered doubtful along with Venezuelan populations for this tick, while the only records for Panama and Colombia were based on wrong tick identifications. *Bona fide* populations of *I. loricatus* range from central-eastern Argentina and southern Uruguay to Paraguay up to north-eastern Brazil. *Dromiciops gliroides* Thomas, the only member of Microbiotheria Ameghino is the exclusive host of *Ixodes neuquenensis* Ringuet, 1947. There is only one record of tick infestation (*Ixodes jonesae* Kohls, Sonenshine & Clifford, 1969) of Paucituberculata Ameghino, indicating that these marsupials are of no apparent importance for maintenance of South American hard ticks. We speculate that the species of *Ixodes* feeding on Didelphimorphia and Sigmodontinae Wagner are a clade derived from ancestors feeding exclusively on Didelphidae that radiated after the invasion of South America by Sigmodontinae or their ancestors. *Ixodes neuquenensis* (established in south-western South America) is considered a relatively new species that radiated from *Ixodes* parasites of Sigmodontinae invaders in southern South America.

Key words: South American marsupials, hosts, ticks, Ixodidae, Metastrata, Prostrata, distribution, life history

Introduction

Marsupials are currently divided into seven extant orders (Wilson & Reeder 2005; Voss & Jansa 2009), of which three are present in South America. Microbiotheria Ameghino and Paucituberculata Ameghino are exclusively Neotropical, while a third order, Didelphimorphia Gill, is distributed throughout the Neotropics and southern Nearctic. The first two orders are considered relictual because their current distribution and number of species has diminished in relation to the past and now comprises a total of seven species. Didelphimorphia are more ancient than