

## Ticks (Acari: Ixodidae, Argasidae) of Coyotes in Panama

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### Abstract

Data are presented for 103 tick specimens collected from four coyotes in two provinces of Panama. Six tick species were recovered: *Amblyomma cajennense* s.l., *Amblyomma oblongoguttatum*, *Amblyomma ovale*, *Amblyomma* sp. near *parvum*, *Haemaphysalis juxtakochi*, and *Ornithodoros* sp. near *puertoricensis*. These collections constitute a preliminary checklist of ticks from the southern coyote population.

**Key words:** ticks, coyotes, Panama, zoonosis risk

### Introduction

Coyotes, *Canis latrans* Say, are common large carnivores in North and Central America, occupying ecosystems in both natural and human-dominated environments (De la Rosa & Nocke 2000, Bekoff & Gese 2003). Like other Carnivora, coyotes play an important role in controlling populations of smaller mammals; however, from an economic perspective, they are a threat because they hunt sheep, calves and poultry, and even attack pets and humans (Connolly 1992, Bekoff & Gese 2003, Literák *et al.* 2012). Coyotes may also spread pathogens, increasing the risk of infections to domestic animals and humans (Stull & Mengak 2009, Niehaus *et al.* 2012).

In North America, it is known that coyotes are parasitized by different groups of mites, ticks, fleas and lice, which are important vectors of several diseases (Bekoff & Gese 2003, Gompper *et al.* 2003, Stull & Mengak 2009). However, data on Central American ectoparasites of coyotes are scarce, particularly in the case of ticks, where there is but a single record of coyote parasitism by *Amblyomma ovale* Koch in Panama (Murgas *et al.* 2013).

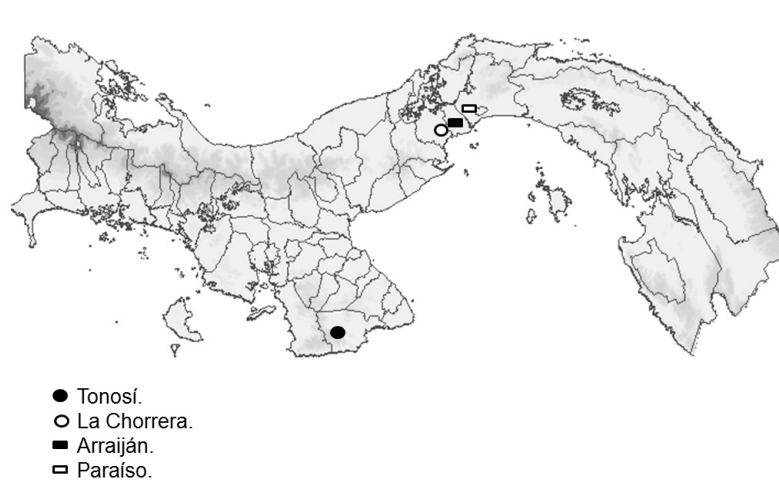
The first observation of *C. latrans* in Panama dates back to 1981, but coyotes are now widely distributed along Panama's Pacific coast (Méndez *et al.* 1981, Vaughan-Dickhaut 1983, DGD unpublished data). Recently, we had an opportunity to collect ticks from coyotes in two of Panama's provinces, and our results constitute a preliminary checklist of ticks that may be expected to occur on these important mammals in southern Central America.

### Materials and methods

We collected ticks from four road-killed coyotes in Panama: one in Los Santos Province (Tonosí) and three at sites in Panama province (La Chorrera, Arraiján and Paraíso) (Fig. 1). Tonosí lies in a

valley where the chief economic activities are agriculture and the raising of livestock. The surrounding countryside consists of fragmented dry deciduous forests in the lowlands and tropical rainforests at higher elevations. La Chorrera and Arraiján are within the Panama City metropolitan area, west of the Panama Canal; Paraíso is a little town located on the east bank of the Canal that is noteworthy for being the site of the first report of coyotes from the eastern part of the country.

Coyote carcasses were initially checked at roadside but were subsequently taken to the Zoological Collection “Dr. Eustorgio Méndez” of the Gorgas Memorial Institute for Health Research (CoZEM-ICGES). Collected ticks were preserved in 75% ethanol, except for engorged immatures and females, which were kept in a controlled environmental incubator (78% RH, 26°C). The taxonomic keys of Fairchild *et al.* (1966) were used for tick species identification. Coyote and tick specimens were deposited in CoZEM-ICGES.



**FIGURE 1.** Coyote collection sites in Panama.

## Results and discussion

Six species of ticks were found: *Haemaphysalis juxtakochi* Cooley, *Amblyomma cajennense* (Fabricius) s.l., *Amblyomma oblongoguttatum* Koch, *Amblyomma ovale*, *Amblyomma* sp. near *parvum* Aragão (Ixodidae), and *Ornithodoros* sp. near *puertoricensis* Fox (Argasidae) (Table 1). Adults of *A. ovale* and *A. oblongoguttatum* parasitize a variety of hosts but are often associated with Carnivora; *A. parvum* and *A. cajennense* s.l. are known from a broad range of mammals; and adult *H. juxtakochi* feed on Artiodactyla, while immatures parasitize various hosts (Fairchild *et al.* 1966, Guglielmone *et al.* 2003). Our specimens of *Ornithodoros* appear to be closely related to *O. puertoricensis*, which parasitizes an extensive variety of vertebrates (Fairchild *et al.* 1966, Guglielmone *et al.* 2003).

Besides *C. latrans*, three other species of wild canids occur in Panama: *Urocyon cinereoargenteus* (Schreber), *Speothos venaticus* (Lund), and *Cerdocyon thous* (L.) (Tejera *et al.* 1999). Panamanian *U. cinereoargenteus* are known to be parasitized by *A. parvum* (Fairchild *et al.* 1966), while *A. ovale* has been collected from *C. thous* (Bermúdez *et al.* 2010, 2012) and coyotes (Murgas *et al.* 2013). Interestingly, both coyotes and *C. thous* were not recorded from Panama until late in the last century. Finally, eight tick species have been found on domestic dogs in Panama: *A.*

*cajennense* s.l., *A. oblongoguttatum*, *A. ovale*, *H. juxtakochi*, *Amblyomma auricularium* (Conil), *Rhipicephalus sanguineus* s.l. (Latreille), *Ixodes affinis* Neumann, and *Ixodes boliviensis* Neumann (Fairchild *et al.* 1966, Bermúdez & Miranda 2011).

**TABLE 1.** Ticks collected from coyotes in Panama, by locality.

	Tick species	Tonosí	La Chorrera	Arraiján	Paraíso
Ixodidae	<i>Amblyomma cajennense</i> s.l.	0	7 (4♂, 3♀)	0	0
	<i>Amblyomma oblongoguttatum</i>	0	0	25(14♂, 11♀)	20 (15♂, 5♀)
	<i>Amblyomma ovale</i>	0	3(2♂, 1♀)	6 (3♂, 3♀)	1(♀)
	<i>Amblyomma</i> nr. <i>parvum</i>	1 (♂)	2 (♂)	0	0
	<i>Haemaphysalis juxtakochi</i>	0	0	3 (3N)	0
	<i>Amblyomma</i> immatures	2 (L)	14 (8L, 6N)	17 (12L, 5N)	4 (2L, 2N)
Argasidae	<i>Ornithodoros</i> nr. <i>puertoricensis</i>	0	0	2 (L)	0

Although we examined only four coyotes, the number of tick species collected is significant, especially considering the frequency of human-coyote contact, and the consequent potential impact of coyotes on public health. Thus, our findings, the first for southern populations of the coyote, should help set the stage for future research on zoonoses transmitted by ectoparasites in Panama and other Central American countries.

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