



What are Portuguese ticks hiding?

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Abstract

Ticks are known as important vectors of etiological agents associated to human and animal disease. The “One Health” approach recognizes the need for integrated work of multidisciplinary teams as requisite for more comprehensive results in zoonotic diseases, such as tick borne diseases (TBD’s) which rely on animals as reservoirs. Tick identification and pathogen detection are critical in the analysis of disease risk and in the establishment of control measures. Thus, in this work it was our first concern to obtain data on the prevalence of ticks and tick-borne diseases such as anaplasmosis, babesiosis and theileriosis in Portugal mainland. Around 200 specimens were collected by flagging/dragging the vegetation and also from vertebrate hosts during 2013 in

32 randomly selected regional administrative regions of the country. Ticks were identified according to morphological characters and included species such as *Dermacentor marginatus*, *Hyalomma lusitanicum*, *Haemaphysalis punctata*, *Ixodes ricinus*, *Rhipicephalus bursa*, *R. pusillus* and *R. sanguineus*. Genomic DNA was extracted and tested for *Babesia* spp., *Theileria* spp., *Anaplasma* spp. And *Ehrlichia* spp. pathogens agents by conventional PCR. Initial screening demonstrates presence of *Babesia*, *Anaplasma* and *Ehrlichia* pathogens in Portuguese ticks. The detection of agents in these arthropods reinforces the need of a continuing epidemiological survey.

Results and Discussion

Table 1 –Evaluation of tick associated pathogens. Number of ticks collected, number of ticks infected, tick species in which pathogens were found. Pathogen species and tick provenience are also stated. Results are divided by district.

	District	Ticks collected	Ticks infected	Vector	Agent	Host
North	Aveiro	1	-	-	-	-
	Braga	31	-	-	-	-
	Bragança	9	-	-	-	-
	Guarda	2	-	-	-	-
	Porto	13	-	-	-	-
	Vila Real	27	1	<i>Rhipicephalus sanguineus</i>	<i>Babesia bigemina</i>	(Vegetation)
	Viana do Castelo	46	-	-	-	-
Center	Viseu	25	1	<i>Rhipicephalus bursa</i>	<i>Anaplasma marginale</i>	<i>Canis familiaris</i>
	Castelo Branco	4	1	<i>Rhipicephalus bursa</i>	<i>Anaplasma ovis</i>	<i>Ovis aries</i>
	Santarém	4	-	-	-	-
	Setúbal	130	6	<i>Rhipicephalus bursa</i>	<i>Anaplasma marginale</i> (5)	<i>Bos taurus</i> (4) & <i>Capra hircus</i> (1)
	Portalegre	29	2	<i>Rhipicephalus bursa</i>	<i>Anaplasma ovis</i> (1)	<i>Capra hircus</i>
				<i>Rhipicephalus bursa</i>	<i>Anaplasma marginale</i>	<i>Capra hircus</i>
				<i>Rhipicephalus bursa</i>	<i>Ehrlichia canis</i>	<i>Capra hircus</i>
South	Évora	8	-	-	-	-
	Beja	17	-	-	-	-
	Faro	24	-	-	-	-
	Total	370	11	2	4	5

* Primers for detection of *Babesia* spp. and *Theileria* spp. were Piro18S (Inokuma *et al.*, 2000) and for *Anaplasma* spp. and *Ehrlichia* spp. were ERH16 (Olmeda *et al.*, 1997).

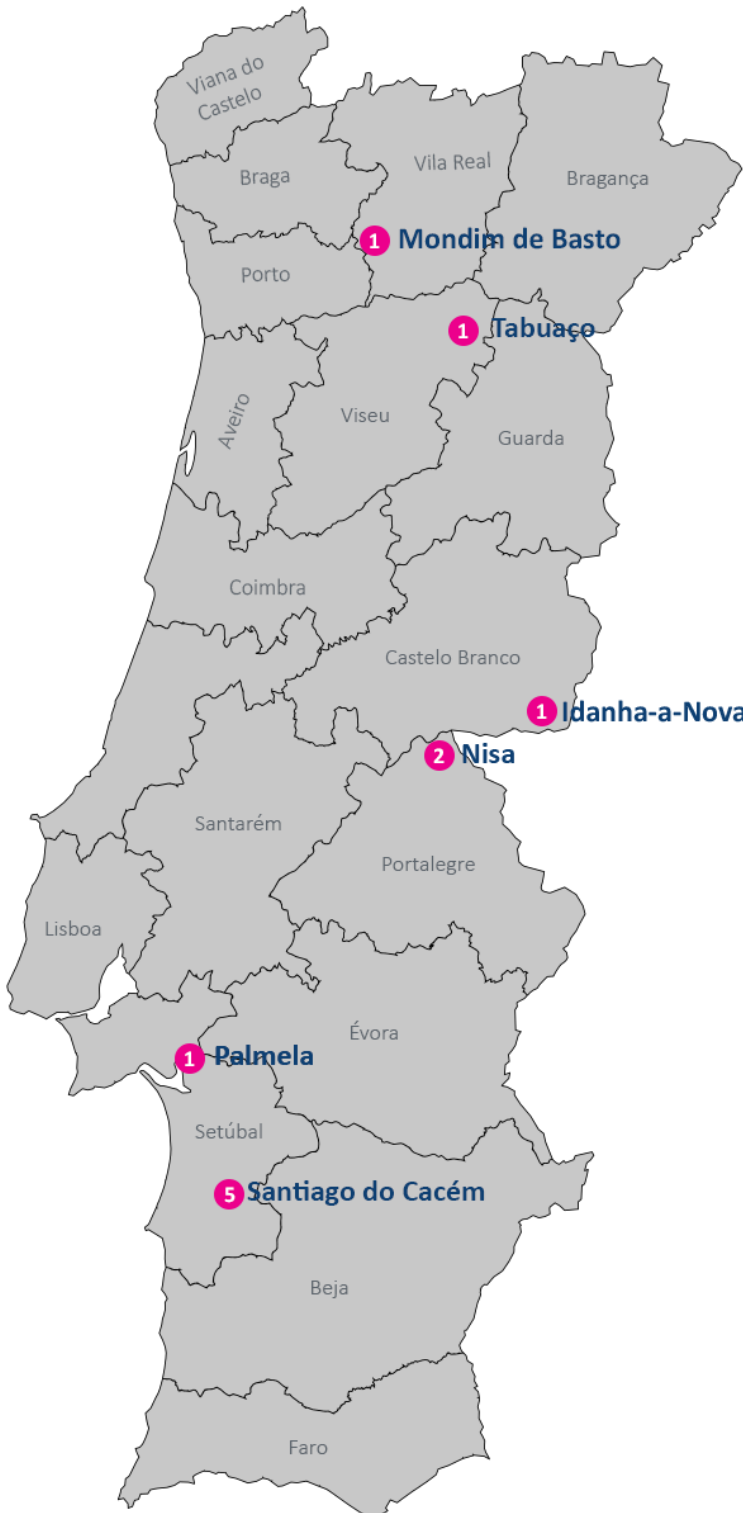


Fig. 2 - Map of the areas within the districts and towns where ticks were found carrying pathogens. Numers represent the number of infected ticks.

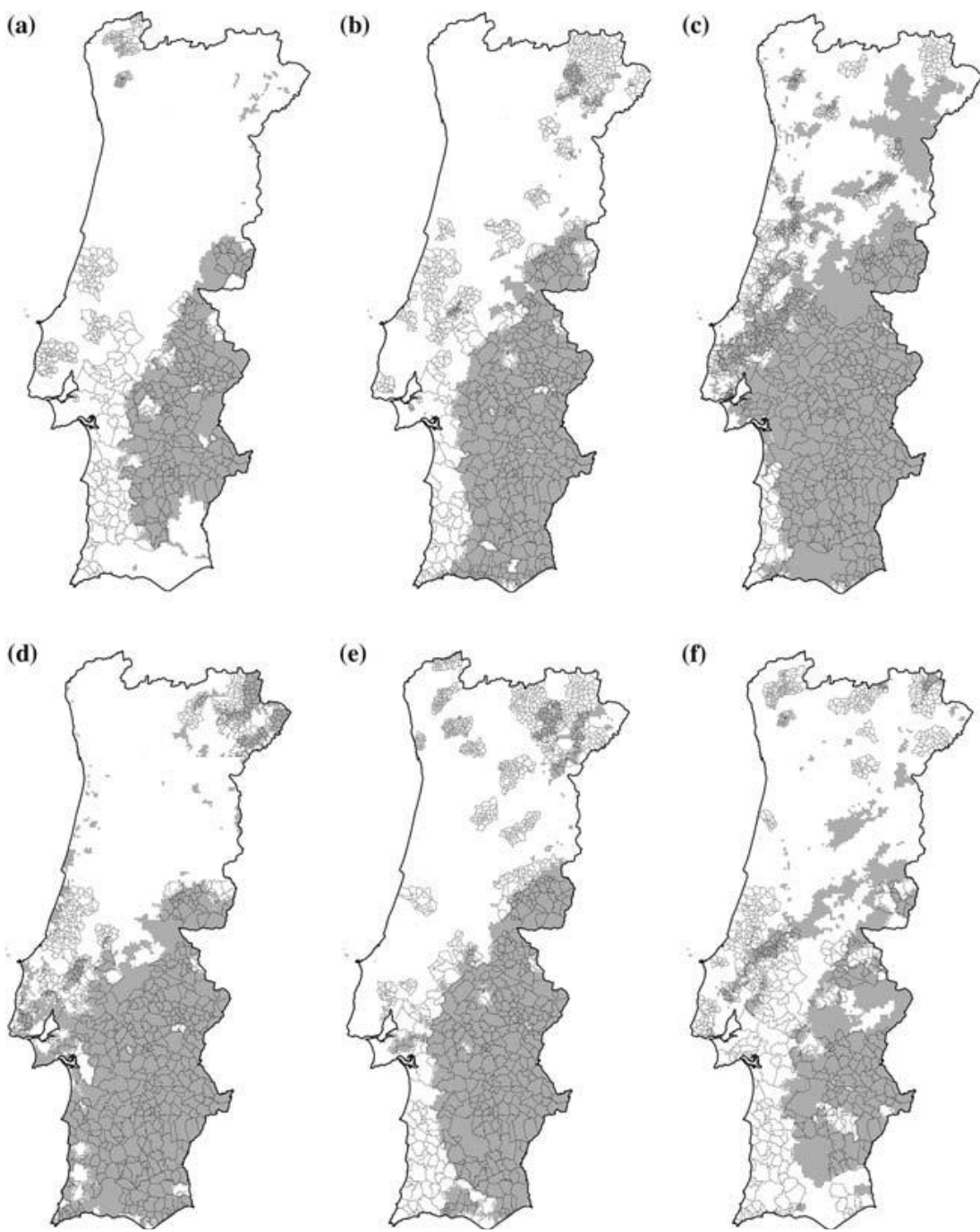


Fig. 1 - The known and predicted distribution of six of the tick species included in this study. The known distribution is mapped as the contour of the administrative division, while the predicted one is mapped with a grey shadow. (a) *R. annulatus*; (b) *R. bursa*; (c) *H. lusitanicum*; (d) *D. marginatus*; (e) *H. m. marginatum*; (f) *I. ricinus*. (Source: Estrada-Peña & Santos-Silva, 2005).

- Ticks are widespread in Portugal, with higher densities in the central and south interior (Fig. 1 and Table 1), mainly due to climatic conditions, such as temperature;
- Results suggest that pathogens found in Portuguese ticks are present in all studied areas (Fig. 2);
- In a total of 370 ticks tested, 2,97 % were found carrying pathogens, mainly *Anaplasma* spp. bacteria;
- From the 4 genera of pathogens tested, only *Theileria* spp. was not found;
- Two species of *Anaplasma* were found in ticks collected from *Bos taurus*, *Ovis aries* and *Capra hircus*. The vector for these was always *R. bursa*;
- One *R. sanguineus* tick was showed to be infected with *Babesia bigemina*;
- This type of study is continuously necessary in order to evaluate and establish areas with higher risk of TBD infection.

References

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