

Diagnostic of *Ixodes woodi* Bishopp, 1911 (Acari: Ixodidae) in Brazil: immigration on *Homo sapiens* - Case report*

Nicolau Maués Serra-Freire¹⁺, Marinete Amorim² and Gilberto Salles Gazêta²

ABSTRACT. Serra-Freire N.M., Amorim M. & Gazêta G.S. **Diagnostic of *Ixodes woodi* Bishopp, 1911 (Acari: Ixodidae) in Brazil: immigration on *Homo sapiens* - Case report.** [Diagnóstico de *Ixodes woodi* Bishopp, 1911 (Acari: Ixodidae) no Brasil: imigração em *Homo sapiens* - Relato de caso.] *Revista Brasileira de Medicina Veterinária*, 37(1):97-99, 2015. Laboratório de Referência Nacional para Vetores das Riquetsioses, Instituto Oswaldo Cruz/FIOCRUZ, Av. Brasil, 4365, Manguinhos, RJ 21045-900, Brasil. E-mail: nmsf@ioc.fiocruz.br

One nymph of *Ixodes woodi* (Ixodidae: Ixodinae) was self-collected from a woman that had just arrived in Rio de Janeiro after a holiday period in Norway, Europe. She traveled by plane presenting a skin irritation on right leg and preserved the parasite that was in her skin. This is the first Brazilian record of *I. woodi*. Also, in South America *Ixodes woodi* hadn't been previously reported. In United State of America, rodents appear to be the main hosts for immature stages, although there are other records from members of *Mammalia* class. *I. woodi* doesn't seem to be a threat to men and domestic mammals, from which has seldom been reported, but there is quoting of his relationship between trophic and rickettsiae bacteria, but no transmission.

KEY WORDS. Hard tick, immigration tick, human being, Rio de Janeiro.

RESUMO. Uma ninfa de *Ixodes woodi* (Ixodidae: Ixodinae) foi recolhida em um auto-exame de uma mulher adulta que retornou ao Brasil depois de um período de viagem à Noruega, Europa. Ela chegou ao Rio de Janeiro por avião com uma irritação da pele na perna direita, removeu e preservou o carrapato que estava fixado em sua pele. Este é o primeiro registro *I. woodi* e na América do Sul. Nos EUA, roedores parecem ser os principais hospedeiros para estágios imaturos, embora haja outros registros para membros da classe *Mammalia*. *Ixodes woodi* não parece ser uma ameaça para o homem e mamíferos domésticos, da qual raramente tem sido relatado, mas há citação de relação trófica dele com riquetsias.

PALAVRAS-CHAVE. Carrapato duro, imigração de carrapatos, parasito de humano.

INTRODUCTION

Ixodes is the largest genus in the Ixodidae, comprising the 45 of them that are known from the Neotropical region (Guglielmone et al. 2003). In Mexico, Guzmán-Cornejo et al. (2007) identified 26 species. In the Holarctic/Neartic subgenus *Ixodopsis* includes the specie *I. (I.) woodi* Bishopp, 1911 (Woodrat Tick).

Ixodes woodi is a hard tick specie (Acari, Ixodida, Ixodidae), which is known to occur in many United States of America states such as Alabama, Arizona, California, Colorado, Idaho, Indiana, Kansas, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah and Wyoming (Kolonin 2009).

Adults of *I. woodi* primarily feed on small rodents in Kansas, USA (Brillhart 1993) (*Neotoma* sp., *Peromyscus leucopus*, *P. maniculatus*), and white

*Received on January 22, 2013.

Accepted for publication on March 15, 2014.

¹ Médico-veterinário, DSc, LD. Laboratório de Referência Nacional para Vetores das Riquetsioses, Instituto Oswaldo Cruz (IOC/FIOCRUZ), Av. Brasil, 4365, Manguinhos, RJ 21045-900, Brasil. *Author for correspondence, E-mail: nmsf@ioc.fiocruz.br - bolsista CNPq.

² Médico-veterinário, DSc. Laboratório de Referência Nacional para Vetores das Riquetsioses, IOC/FIOCRUZ, Av. Brasil, 4365, Manguinhos, RJ, 21045-900. E-mails: mamorim@ioc.fiocruz.br; gsgazeta@ioc.fiocruz.br

deer tail (*Odocoileus virginianus*), but in the Mexican states of Coahuila, Morelos, and Tamaulipas, have also been found on Cricetidae (Guzmán-Cornejo & Robbins 2010). Human being (*Homo sapiens*) are host in North America, indeed.

According to Camicas et al. (1998) this species occurs in Mammals Tenrecidae. The tenrecídeos are a family of small insectivorous mammals that inhabit Republic of Madagascar mainly, with exception of the subfamily Potamogalinae, that lives in continental Africa (Bronner & Jenkins 2005). It can be assumed then that *I. woodi* happens in Africa.

Banks et al. (1998) study of the laboratory life cycle of *I. woodi* reported that larvae and nymphs fed for an average of four days; approximately 8-9 days were required for females to engorge. Females laid approximately 900 eggs that requires an average of 37.33 days to hatch.

Kurtti et al. (2002) examined a parthenogenesis strain of *I. woodi* for the presence of endosymbiotic bacteria. Electron microscopic examination revealed the ovarian tissues and Malpighian tubules were infected with pleomorphic bacteria. Two basic types were observed: a larger granular cell and a smaller condensed cell. Phylogenetic analysis indicated that the ticks were infected with an endosymbiont belonging to the gamma subdivision of the Proteobacteria. It clustered with the insect pathogenic species *Rickettsiella grylli* (Vago & Martoja 1963) and the animal pathogen *Coxiella burnetii* (Derrick 1939) Philip 1948. The results suggest that the *I. woodi* females harbored a single endosymbiotic bacterium related to selected *Rickettsiella* spp. and to *C. burnetii*.

In United States of America the Centers for Disease Control (CDC) surveillance case definition was developed for national reporting of Lyme and Rock Mountain Spot Fever Disease, but it is not intended to be used in clinical diagnosis. In Brazil the National Coordination of Monitoring has similar actions. The accompaniment epidemiologist sample reports of the illnesses are probably not complete and demands completeness to be obtained on each illness. The degree of completeness of the report could be influenced by the available diagnostic easiness's, as for the identification of ticks that parasite human.

Although the occurrence of genera *Amblyomma*, *Rhipicephalus* and *Ixodes* has been recorded in human in Brazil (Louly et al. 2006, Dantas-Torres et al. 2006, Serra-Freire 2009, 2010, 2011, **Borsoi & Serra-Freire 2012**), those genera were also included in transmission of the protozoan and rickettsia to human.

In July/2010 a Brazilian woman who was married to a Norwegian and usually traveled between the two countries, returned from a period of residence in Europe entering in Brazil through Tom Jobim International Airport. During the flight she felt a constant and uncommon itch in the leg. In the following day of her arrival, in her apartment in Barra da Tijuca, while she was bathing she found a dark signal in the leg, in the shape of a drop, circumscribed the red halo, exactly in the region that was itching during the flight. While observing the skin mark, she realized that there was a strange movement inside of it. After scratching a little, accidentally she removed the hard tick that was on it. So, she placed it in transparent container and looked for medical aid. In every medical care appointment - doctor's office, clinic, laboratory of clinical analyses - the woman showed the material that was completely ignored and was advised to discard it. She received prescriptions for pomades cleanness application and was asked to perform exams, such as biopsies place, harvest of blood for parasites examinations and biochemists, also serum tests IgG, IgM, test Elisa and Westernblot for Illness of Lyme. After another doctor's guidance, she went to LIRN/Fiocruz bringing the "skin mark" that was supposed to be discarded.

The material was readily recognized as a nymph of hard tick, and it was requested from her the result of all the exams she had already performed, while the tick would be mounted in preparation for examination for light microscopy. The examination showed no evidence of presence of agents transmitted for ticks, fact that was confirmed for the new exams in the months of September and November/2010. The tick was identified to the *Ixodes* (*Ixodiopsis*) *woodi* Bishopp 1911 according to description of the Robbins & Keirans (1987, 1992), the Durden & Keirans (1995), and the works of Kolonin (1981), Guglielmone et al. (2003), Guzmán-Cornejo & Robbins (2010).

Little is known about the relationships between tick and tick-borne disease in Brazil for species of recognized distribution in the domestic territory what it must alert the service of monitoring in health with the possibility of immigration of exotic species. However, genera *Ixodes* are a vector to a considerable number of pathogens of medical and veterinary importance. Until our knowledge of associations between Brazilian Ixodidae and pathogenic organism improves, it is therefore important to gather precise information on the migration of tick species.

REFERENCES

- Banks C.W., Oliver J.H.Jr, Hopla C.E. & Dotson E.M. Laboratory life cycle of *Ixodes woodi* (Acari: Ixodidae). *J. Med. Entomol.*, 35:177-179, 1998.
- Borsoi A.B.P. & Serra-Freire N.M. Relações parasitárias entre humanos e carrapatos no município de Volta Redonda, Estado do Rio de Janeiro. *Rev. Uniabeu*, 5:306-317, 2012.
- Brillhart D.B. Sero-prevalence of Lyme disease antibodies in *Peromyscus leucopus*, *Peromyscus maniculatus* and *Odocoileus virginianus*, and distribution of potential tick vectors, in Kansas. MS thesis, Kansas State University, 1993, 88p. (Disponível em: www.k-state.edu/parasitology/625tutorials/Tick04.html)
- Bronner G.N. & Jenkins P.D. Order Afrosoricida, p.71-81. In: Wilson D.E. & Reeder D.M. (Eds), *Mammal Species of the World: A Taxonomic and Geographic Reference*. 3rd ed. John Hopkins University Press, Baltimore, 2005.
- Camicas J.L., Hervy J.P., Adam F. & Morel P.C. *Les tiques du monde (Acarida, Ixodida): Nomenclature, Stades, décrits, Hôtes, Répartition*. Ed. De l'Orstom, Paris, 1998. 233p.
- Dantas-Torres F., Figueredo L.A. & Brandão-Filho S.P. *Rhipicephalus sanguineus* (Acari: Ixodidae), the Brown dog tick, parasitizing humans in Brazil. *Rev. Soc. Bras. Med. Trop.*, 39:64-67, 2006.
- Durden L.A. & Keirans J.E. *Nymphs of the genus Ixodes (Acari: Ixodidae) of the United States: taxonomy, identification key, distribution, hosts and medical veterinary importance*. Entomological Society of America, Lanham, 1995. 95p.
- Guglielmo A.A., Estrada-Peña A., Keirans J.E. & Robbins R.G. Ticks (Acari: Ixodida) of the Neotropical zoogeographic region. Special Publication, International Consortium on Ticks and Tick-borne Diseases, Atlanta. Houten, The Netherlands, 2003. 173p.
- Guzmán-Cornejo C. & Robbins R.G., The genus *Ixodes* (Acari: Ixodidae) in Mexico: adult identification keys, diagnoses, hosts, and distribution. *Rev. Mexicana Biodiversidad*, 81:289-298, 2010.
- Kolonin G.V. *Fauna of Ixodid Ticks of the World*. Moscou, 2009. (Disponível em <http://www.kolonin.org/13_14html#r228>).
- Kolonin G.V. *World distribution of ixodid ticks (genus Ixodes)*. Nauka, 1981. 114p.
- Kurtti T.J., Palmer A.T. & Oliver Jr J.H. Rickettsiella-like bacteria in *Ixodes woodi* (Acari: Ixodidae). *J. Med. Entomol.*, 39:534-540, 2002.
- Louly C.C.B., Fonseca I.N., Oliveira V.F. & Borges L.M.F. Ocorrência de *Rhipicephalus sanguineus* em trabalhadores de Clínicas Veterinárias e Canis, no Município de Goiânia, Go. *Cienc. An. Bras.*, 7:103-106, 2006.
- Robbins R.G. & Keirans J.E. *Ixodes (Ixodiopsis) woodi* (Acari: Ixodidae): Description of the Larva and redescription of the Nymph. *J. Med. Entomol.*, 24:310-314, 1987.
- Robbins R.G. & Keirans J.E. *Systematics and Ecology of the Subgenus Ixodiopsis (Acari: Ixodidae: Ixodes)*. Thomas Say Foundation Series, Entomological Society of America, 1992. 159p.
- Serra-Freire N.M., *Doenças causadas por carrapatos*, p.377-402. in Marcondes C.B. (Ed.), *Doenças transmitidas e causadas por Artrópodes*. Ed. Atheneu, Rio de Janeiro, 2009.
- Serra-Freire N.M. Occurrence of ticks (Acari: Ixodidae) on human hosts, in three municipalities in the State of Pará, Brazil. *Braz. J. Vet. Parasitol. Res.*, 19:141-147, 2010.
- Serra-Freire N.M., Sena L.M.M. & Borsoi A.B.P. Parasitismo humano por carrapatos na Mata Atlântica, Rio de Janeiro, Brasil. *Entomo-Brasilis*, 4:67-72, 2011.