



Parasitism by *Amblyomma rotundatum* Koch, 1844 (Acari: Ixodidae) associated with blefaritis on a red-footed tortoise (*Chelonoidis carbonarius*) in Rio de Janeiro state – case report

Parasitismo por *Amblyomma rotundatum* Koch, 1844 (Acari: Ixodidae) associado a blefarite em jabuti-piranga (*Chelonoidis carbonarius*) no estado do Rio de Janeiro – relato de caso

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Abstract

Amblyomma rotundatum is a tick species commonly found on reptiles and amphibians. In Brazil, investigations of this ectoparasite have indicated its distribution across all Brazilian biomes, although it is concentrated in certain locations. In this context, the objective of the present study was to describe a case of parasitism by *A. rotundatum* in a red-footed tortoise (*Chelonoidis carbonarius*) in the state of Rio de Janeiro. A female red-footed tortoise (*C. carbonarius*), seized by the environmental police, was parasitized by a tick in the left periocular region. The tick was manually removed, preserved in 70° GL ethanol, and sent for identification at the Federal Rural University of Rio de Janeiro (UFRRJ). Based on the morphological evaluation Dantas-Torres et al. (2019), Barros-Battesti et al. (2006) and Lampo et al. (1997), a diagnosis of a female specimen of *A. rotundatum* was made. In conclusion, this study reports the first case of *A. rotundatum* parasitizing *C. carbonarius* in the state of Rio de Janeiro, highlighting the presence of periocular blepharitis associated with this parasitism.

Keywords: tick, ectoparasite, chelonian.

Resumo

Amblyomma rotundatum é uma espécie de carrapato comumente encontrada em répteis e anfíbios. No Brasil, as investigações desse ectoparasito indicam sua distribuição em todos os biomas brasileiros, embora concentrado em algumas localidades. Nesse contexto, o objetivo do presente estudo foi descrever um caso de parasitismo por *A. rotundatum* em jabuti-piranga (*Chelonoidis carbonarius*) no estado do Rio de Janeiro. Uma fêmea de jabuti-piranga (*C. carbonarius*), apreendida pela Polícia Ambiental, estava parasitada por carrapato na região periocular esquerda. O carrapato foi removido manualmente, preservado em etanol 70° GL e encaminhado para identificação na Universidade Federal Rural do Rio de Janeiro (UFRRJ). Com base na avaliação morfológica Dantas-Torres et al. (2019), Barros-Battesti et al. (2006) e Lampo et al. (1997), foi feito o diagnóstico de um espécime fêmea de *A. rotundatum*. Em conclusão, este estudo relata o primeiro caso de *A. rotundatum* parasitando *C. carbonarius* no estado do Rio de Janeiro, destacando a presença de blefarite periocular associada a este parasitismo.

Palavras-chave: carrapato, ectoparasito, quelônio.




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Introduction

Amblyomma rotundatum Koch, 1844 is an ixodid tick known to parasitize a variety of amphibians and reptiles, including anurans, chelonians, lacertids, snakes, and crocodylians (Guglielmone & Nava, 2010; Martins et al., 2020; Scott & Durden, 2015). The significance of this ectoparasite lies in the inflammatory reactions and hypersensitivity it causes in its hosts, as well its potential role as a transmitter of pathogens in nature, as evidenced by pathogenic agents found in molecular analyses (Luz et al., 2013; Ogrzewalska et al., 2019; Rodrigues et al., 2010). Furthermore, a case of toxicosis and paralysis resulting from the bite of a female ixodid tick was observed in a southern black racer snake (*Coluber constrictor priapus*) (Hanson et al., 2007).

Geographically, *A. rotundatum* has a distribution ranging from the southern Nearctic to the northern and central Neotropics, encompassing northern Argentina to the southern United States (Guglielmone & Nava, 2010). This wide distribution is facilitated by the easy dispersion of its immature stages on wild animals, particularly reptiles and amphibians. Additionally, its ability to reproduce through parthenogenesis contributes to the establishment of populations (Scott & Durden, 2015; Viana et al., 2012).

In Brazil, according to Polo et al. (2021), *A. rotundatum* is found throughout all Brazilian biomes, although it is more concentrated in the Amazon and Cerrado biomes.

Within the state of Rio de Janeiro, which falls within the Atlantic Forest biome, this tick species has been reported parasitizing *Tropidurus torquatus* and *Ameiva ameiva* lacertids, *Philodryas olfersii* snakes (Viana et al., 2012), and *Rhinella icterica* frogs (Cepeda et al., 2018).

Despite its narrow specificity for reptiles and amphibians and its wide geographic distribution, studies have indicated a sympatric relationship between *A. rotundatum* and *A. dissimile*, a tick species closely associated with reptiles and amphibians. This highlights the need for a more detailed description of the hosts of each species to facilitate the development of robust epidemiological and parasitic studies (Polo et al., 2021; Scott & Durden, 2015).

Given the importance of establishing a parasitic profile and contributing to the epidemiology of ticks in wild animals, the objective of this study is to describe a case of *A. rotundatum* parasitism in a red-footed tortoise (*Chelonoidis carbonarius*) in the state of Rio de Janeiro.

Case report

A young female specimen of a red-footed-tortoise (*C. carbonarius*) was confiscated by the environmental police and placed in an outdoor enclosure at the Wild Animal Screening Center (CETAS) in Seropédica - RJ. The enclosure housed approximately 200 other tortoises and had a substrate of dirt. The tortoise was separated from the group due to the presence of a tick attached to its left periocular area (Figure 1A). The origin of the tortoise is unknown and it is not possible to determine if it came from another state.

The animal was then taken to the veterinary clinic at CETAS-RJ, where a severe case of blepharitis was observed at the site where the tick was attached. The tick was manually removed by rotating its body until the gnathosoma was completely detached from the tortoise's skin. It was then preserved in 70° GL ethanol and sent to the Laboratory of Experimental Chemotherapy in Veterinary Parasitology (LQEPV) at the Federal Rural University of Rio de Janeiro (UFRRJ) for identification.

The tick was morphologically identified and examined using a stereomicroscope, relying taxonomic keys (Barros-Battesti et al., 2006; Dantas-Torres et al., 2019; Lampo et al., 1997).

The specimen exhibited elongated mouthparts, a hypostome dentition of 3/3 and absence of cornua on the posterior margin of the gnathosoma. The scutum was reduced in size, predominantly dark brown, and had subtle ornamentation. Soft spots were present on the sides and central region, while the posterior edge appeared whitish with a few large punctuations, primarily concentrated on the anterior lateral portions, along with numerous smaller ones. Coxae I-IV displayed two spurs, with coxa I having short spurs of nearly equal length and coxa IV exhibiting an inconspicuous internal spur compared to the external one. The spiracular plate lacked festoons, and the dorsum of the arthropod had little hair. Based on these characteristics, the tick was identified as a female *A. rotundatum* (Figure 2).



Figure 1. Female *Chelonoidis carbonarius*. (A) Engorged female *Amblyomma rotundatum* tick attached to the left periocular region. (B) Immediate observation of severe left blepharitis following tick removal.

After removing the tick from the red-footed tortoise, a lesion was observed (Figure 1B). The lesion was then subjected to antiseptic treatment using flexible cotton swabs sprayed with Furanyl® (chlorhexidine digluconate). Once the area was cleaned, a small amount of ointment containing silver sulfadiazine was applied to the lesion using the same flexible cotton swabs. Furthermore, Flamavet® 0.2% (meloxicam) was administered intramuscularly in the forelimb, at a dosage of 0.2mg/kg, following a once-daily application protocol for three days. These treatment protocols were based on the reptile literature as described by Klaphake et al. (2017). Immediately after removing the tick, a blood sample was collected for a complete blood count and blood parasite investigation.

The results of the blood count revealed that the erythrogram was within normal parameters. The hematocrit values were 21% (reference range: 6-38%), the mean corpuscular volume was 381.8 fL (reference range: 22-940 fL), and the average corpuscular hemoglobin concentration was 32.4g/dL (reference range: 28.8-32.4 d/dL). However, the leukogram showed leukopenia, with a count of 1,500/ μ L (reference range: 11,500 to 20,000/ μ L). Lymphopenia was also observed, with a count of 90/ μ L (reference range: 120 to 9,100/ μ L), as well as monocytopenia, with a count of 15/ μ L (reference range: 20 to 580/ μ L), and basopenia, with a count of 15/ μ L (reference range: 30 to 3480/ μ L). The reference values for these parameters in the species were based on the literature described by Klaphake et al. (2017). The blood smears did not reveal the presence of hemoparasites, but toxic heterophils, degranulated heterophils, and rare reactive lymphocytes were observed.



Figure 2. Engorged female *Amblyomma rotundatum*. (A) Measurement verification of the received specimen, in centimeters. (B) Brown scutum with inconspicuous ornamentation, featuring coppery longitudinal spots on the lateral lamps and between the cervical grooves, along with numerous deep punctuations. Absence of cornua. (C) Ventral view of the gnathosoma, showing detailed hypostomal dentition (3/3). (D) Coxa I exhibiting two short and subequal spurs, with the external slightly longer than internal spur.

One week after the removal of the ectoparasite and initiation of the anti-inflammatory protocol, the animal exhibited normal feeding and drinking behaviors (normophagia and normodipsia) and showed substantial improvement in the healing process, with a significant reduction in blepharitis.

Discussion

The tick species *A. rotundatum* is widely distributed across all regions of Brazil (Polo et al., 2021), with a higher frequency of reports in the North and Northeast regions. It has been observed parasitizing various species of reptiles and amphibians in these areas (Alcantara et al., 2018; Dantas-Torres et al., 2010a; Dantas-Torres et al., 2010b; Martins et al., 2020; Oda et al., 2018). In the southeastern region of Brazil, there have been relatively few descriptions of the hosts of *A. rotundatum*. Reports include frogs of the species *Rhinella schneideri* in the state of Minas Gerais (Luz et al., 2013), as well as lacertids such as *Tropidurus torquatus* and *Ameiva ameiva*, and a snake of the species *Philodryas olfersii* (Viana et al., 2012) and frogs such as *Rhinella icterica* (Cepeda et al., 2018) in the state of Rio de Janeiro.

Therefore, this study adds to the list of *A. rotundatum* hosts reported in the state of Rio de Janeiro. While previous studies have documented the parasitism of *C. carbonarius* by this tick species in other locations in Brazil (Dantas-Torres et al., 2010a; Dantas-Torres et al., 2010b; Martins et al., 2020), no studies describing this specific host-parasite relationship were found for the state of Rio de Janeiro. The present report may be attributed to the increased surveillance of wild animal smuggling in recent years (Cavalcanti & Nunes, 2019). The combination of captivity-induced

stress and the high concentration of tortoise specimens at CETAS-RJ facilitated the detection of *A. rotundatum* in *C. carbonarius*. However, it is important to note that the origin of the tortoise could not be determined due to the lack of information regarding its smuggling history and the absence of any identification markings (e.g., microchip).

Regarding the red-footed tortoise described in this case, a significantly inflamed area can be observed after the mechanical removal of the tick (Figure 1B), indicating a potential source of pain. According to Luz et al. (2013), ticks of the species *A. rotundatum* can cause severe ulcerative and hemorrhagic lesions during their feeding stages, as their hypostome deeply penetrates the dermis, which can ultimately result in the death of the host. Therefore, it is crucial to monitor the lesion closely to control inflammation, alleviate pain, and prevent secondary infections. The alterations observed in the leukogram suggest an inflammatory process induced by parasitism, which in this study may be associated with concurrent secondary infections (Museti et al., 2014).

It is important to note that the collected specimen of *A. rotundatum* was not examined for the presence of pathogens. However, it is worth highlighting that *Amblyomma* spp. ticks are known carriers of *Rickettsia* spp. and other potential zoonotic microorganisms (Erster et al., 2015; Horta et al., 2015; Ogrzewalska et al., 2019). Therefore, it is crucial to identify ticks found on reptiles and assess the potential pathogens they may harbor.

Conclusion

In conclusion, this report demonstrates the presence of the ixodid tick *A. rotundatum* parasitizing red-footed tortoises (*C. carbonarius*) in Brazil and causing periocular blepharitis. Additionally, this study highlights the first documented parasitic relationship between *A. rotundatum* and red-footed tortoises in the state of Rio de Janeiro.

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Ethics statement

All procedures were consented by the institution responsible for the animal (for case reports).

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Conflict of interests

BEPB, YHS, GACL, CSLEM, TRC and DAB - No conflict of interest.

Authors' contributions

BEPB - Development of methodology; writing; review; editing manuscript; acquisition of the financial support for the project leading to this publication. YHS - Development of methodology; writing; review; editing manuscript. GACL and CSLEM - Development of methodology. TRC - Writing; review. DAB - Review.

Availability of complementary results

There is no complementary information to be added.

Part of the study was carried out at the Wild Animal Screening Center (CETAS), Seropédica, RJ, Brazil, and the other part at the Laboratory of Experimental Chemotherapy in Veterinary Parasitology/Department of Animal Parasitology of the Veterinary Institute of the Federal Rural University of Rio de Janeiro, Seropédica, RJ, Brazil.

References

- Alcantara, E. P., Silva, C. F., Ávila, R. W., Pacheco, R. C., Martins, T. F., Munoz-Leal, S., & Morais, D. H. (2018). Ticks (Acari: Argasidae and Ixodidae) infesting amphibians and reptiles in Northeastern Brazil. *Systematic and Applied Acarology*, 23(8), 1497-1508. <http://dx.doi.org/10.11158/saa.23.8.1>.
- Barros-Battesti, D. M., Arzua, M., & Bechara, G. H. (2006). *Carrapatos de importância médico-veterinária da região neotropical: Um guia ilustrado para identificação de espécies*. Vox/ICTTD/Butantan.
- Cavalcanti, C. A. T., & Nunes, V. S. (2019). O tráfico da avifauna no nordeste brasileiro e suas consequências socioambientais. *Revista de Ciência Veterinária e Saúde Pública*, 6(2), 405-415. <http://dx.doi.org/10.4025/revcivet.v6i2.44117>.
- Cepeda, M. B. B., Bahia, M., & Moreno, A. B. (2018). Ocorrência de *Amblyomma rotundatum* Koch 1844 (Acari: Ixodidae) em *Rhinella icterica* (Spix 1824) (Anura: Bufonidae) em Maricá, Rio de Janeiro, Brasil. *Arquivos de Ciências Veterinárias e Zoologia da UNIPAR*, 21(3), 131-134.
- Dantas-Torres, F., Ferreira, D. R., Melo, L. M., Lima, P. A. C., Siqueira, D. B., Rameh-de-Albuquerque, L. C., Melo, A. V., & Ramos, J. A. (2010a). Ticks on captive and free-living wild animals in northeastern Brazil. *Experimental & Applied Acarology*, 50(2), 181-189. <http://dx.doi.org/10.1007/s10493-009-9296-5>. PMID:19693679.
- Dantas-Torres, F., Martins, T. F., Muñoz-Leal, S., Onofrio, V. C., & Barros-Battesti, D. M. (2019). Ticks (Ixodida: Argasidae, Ixodidae) of Brazil: Updated species checklist and taxonomic keys. *Ticks and Tick-Borne Diseases*, 10(6), 101252. <http://dx.doi.org/10.1016/j.ttbdis.2019.06.012>. PMID:31255534.
- Dantas-Torres, F., Siqueira, D. B., Rameh-De-Albuquerque, L. C., Silva E Souza, D., Zanotti, A. P., Ferreira, D. R. A., Martins, T. F., Senna, M. B., Wagner, P. G. C., Silva, M. A., Marvulo, M. F. V., & Labruna, M. B. (2010b). Ticks infesting wildlife species in northeastern Brazil with new host and locality records. *Journal of Medical Entomology*, 47(6), 1243-1246. <http://dx.doi.org/10.1603/ME10156>. PMID:21175080.
- Erster, O., Roth, A., Avni, Z., King, R., & Shkap, V. (2015). Molecular detection of *Rickettsia bellii* in *Amblyomma rotundatum* from imported red-footed tortoise (*Chelonoides carbonaria*). *Ticks and Tick-Borne Diseases*, 6(4), 473-477. <http://dx.doi.org/10.1016/j.ttbdis.2015.03.015>. PMID:25865033.
- Guglielmono, A. A., & Nava, S. (2010). Hosts of *Amblyomma dissimile* Koch, 1844 and *Amblyomma rotundatum* Koch, 1844 (Acari: Ixodidae). *Zootaxa*, 2541(1), 27-49. <http://dx.doi.org/10.11646/zootaxa.2541.1.2>.
- Hanson, B. A., Frank, P. A., Mertins, J. W., & Corn, J. L. (2007). Tick paralysis of a snake caused by *Amblyomma rotundatum* (Acari: Ixodidae). *Journal of Medical Entomology*, 44(1), 155-157. [http://dx.doi.org/10.1603/O022-2585\(2007\)44\[155:TPOASC\]2.O.CO;2](http://dx.doi.org/10.1603/O022-2585(2007)44[155:TPOASC]2.O.CO;2). PMID:17294934.
- Horta, M. C., Saraiva, D. G., Oliveira, G. M., Martins, T. F., & Labruna, M. B. (2015). *Rickettsia bellii* in *Amblyomma rotundatum* ticks parasitizing *Rhinella jimi* from northeastern Brazil. *Microbes and Infection*, 17(11-12), 856-858. <http://dx.doi.org/10.1016/j.micinf.2015.08.010>. PMID:26344601.
- Klaphake, E., Gibbons, P. M., Sladky, K. K., & Carpenter, J. W. (2017). Reptiles. In J. W. Carpenter & C. Marion (Eds.), *Exotic animal formulary* (5th ed., pp.81-149). Elsevier.
- Lampo, M., Rangel, Y., & Mata, A. (1997). Genetic markers for the identification of two tick species, *Amblyomma dissimile* and *Amblyomma rotundatum*. *The Journal of Parasitology*, 83(3), 382-386. <http://dx.doi.org/10.2307/3284398>. PMID:9194816.
- Luz, H. R., Faccini, J. L. H., Pires, M. S., Silva, H. R., & Barros-Battesti, D. M. (2013). Life cycle and behavior of *Amblyomma rotundatum* (Acari: Ixodidae) under laboratory conditions and remarks on parasitism of toads in Brazil. *Experimental & Applied Acarology*, 60(1), 55-62. <http://dx.doi.org/10.1007/s10493-012-9628-8>. PMID:23100108.
- Martins, T. F., Reis, J. L., Viana, E. B., Luz, H. R., Oda, F. H., Dantas, S. P., & Labruna, M. B. (2020). Ticks (Acari: Ixodidae) on captive and free-ranging wild animals in Tocantins State, a Cerrado-Amazon transition region of northern Brazil. *International Journal of Acarology*, 46(4), 254-257. <http://dx.doi.org/10.1080/01647954.2020.1757756>.
- Museti, M. R., Aoki, M., & Pinheiro, S. R. (2014). Reabilitação de jabuti (*Chelonoidis carbonaria*) com problema de casco: Relato de caso. *Revista Scientia Vitae*, 1(3), 91-95.
- Oda, F. H., Kitagawa, C., Noronha, J. D. C., Rodrigues, D. D. J., Martins, T. F., Valadão, M. C., Carvalho, L. M., & Campos, A. K. (2018). *Amblyomma* species infesting amphibians and reptiles in the seasonally dry Amazon forest, with new host records for *Amblyomma rotundatum* (Acari: Ixodida: Ixodidae). *Systematic and Applied Acarology*, 23(2), 387-392. <http://dx.doi.org/10.11158/saa.23.2.14>.
- Ogrzewalska, M., Machado, C., Rozental, T., Forneas, D., Cunha, L. E., & Lemos, E. R. S. (2019). Microorganisms in the ticks *Amblyomma dissimile* Koch 1844 and *Amblyomma rotundatum* Koch 1844 collected from snakes in Brazil. *Medical and Veterinary Entomology*, 33(1), 154-161. <http://dx.doi.org/10.1111/mve.12341>. PMID:30484879.
- Polo, G., Luz, H. R., Regolin, A. L., Martins, T. F., Winck, G. R., Silva, H. R., Onofrio, V. C., Labruna, M. B., & Faccini, J. L. (2021). Distribution modeling of *Amblyomma rotundatum* and *Amblyomma dissimile* in Brazil: Estimates of environmental suitability. *Parasitology Research*, 120(3), 797-806. <http://dx.doi.org/10.1007/s00436-020-06924-9>. PMID:33068151.
- Rodrigues, D. S., Maciel, R., Cunha, L. M., Leite, R. C., & Oliveira, P. R. D. (2010). *Amblyomma rotundatum* (Koch, 1844)(Acari: Ixodidae) two-host life-cycle on Viperidae snakes. *Revista Brasileira de Parasitologia Veterinária*, 19(3), 174-178. <http://dx.doi.org/10.1590/S1984-29612010000300009>. PMID:20943022.

- Scott, J. D., & Durden, L. A. (2015). First record of *Amblyomma rotundatum* tick (Acari: Ixodidae) parasitizing a bird collected in Canada. *Systematic and Applied Acarology*, 20(2), 155-161. <http://dx.doi.org/10.11158/saa.20.2.1>.
- Viana, L. A., Winck, G. R., Almeida-Santos, M., Telles, F. B. D. S., Gazêta, G. S., & Rocha, C. F. D. (2012). New host records for *Amblyomma rotundatum* (Acari: Ixodidae) from Grussaí restinga, Rio de Janeiro, Brazil. *Revista Brasileira de Parasitologia Veterinária*, 21(3), 319-322. <http://dx.doi.org/10.1590/S1984-29612012000300028>. PMID:23070450.