

Rhipicephalus appendiculatus and *Rhipicephalus zambeziensis*

Brown Ear Tick

Last Updated: June 2022



IOWA STATE UNIVERSITY
College of Veterinary Medicine



Importance

Rhipicephalus appendiculatus is a hard tick, found in Africa, that feeds in the ears of cattle, small ruminants and other livestock. It also infests wildlife including African buffalo (*Syncerus caffer*) and antelope. This tick is considered to be a major pest in areas where it is endemic. Heavy infestations can cause anemia, severe damage to the ears, or the loss of resistance to some tick-borne infections. More than a thousand ticks have been found on some animals. *R. appendiculatus* can also transmit a number of pathogens including *Theileria parva* (East Coast fever), Nairobi sheep disease virus and Thogoto virus.

A closely related species, *Rhipicephalus zambeziensis*, which has similar feeding patterns and hosts, occurs in hotter, drier areas of Africa. It is known to transmit at least some of the same pathogens as *R. appendiculatus*, including *T. parva*.

Species Affected

The preferred hosts for *R. appendiculatus* include cattle, African buffalo, large tragelaphine antelope, eland (*Taurotragus oryx*) and waterbuck (*Kobus ellipsiprymnus*); however, it is also found regularly on some other ungulates including sheep and goats. This tick is sometimes seen on wild or domestic canids and felids, and one study found large numbers of adult ticks on sick or elderly lions. Immature ticks may feed on additional species such as livestock, small antelope, carnivores, hares and other mammals. *R. zambeziensis* is thought to use similar hosts.

Geographic Distribution

R. appendiculatus and *R. zambeziensis* occur in parts of sub-Saharan Africa. *R. appendiculatus* has also become established on some islands in the Indian Ocean (e.g., Mauritius, Grande Comore). *R. appendiculatus* prefers humid and relatively cool, shaded, shrubby or woody savannas or woodlands with at least 24 inches of annual rainfall, while *R. zambeziensis* occurs in hotter, drier regions. Their distribution can overlap in some transitional areas.

Life Cycle

R. appendiculatus and *R. zambeziensis*, which are three-host ticks, can be found on the host for several days while they feed, then drop to the ground to develop to the next stage. In cattle, African buffalo and large antelope, the adult ticks congregate mostly in the ears but can also be found on the head. Immature *R. appendiculatus* tend to attach in the ears, on the head and on the legs.

R. appendiculatus completes one life cycle per year in the subtropical central and southern regions of Africa, and the occurrence of adults, nymphs or larvae is seasonal, with most adult ticks found from mid-summer to late summer. In tropical areas, more than one life cycle can be completed each year, and all stages occur at one time. Up to three generations per year may be seen in areas with sufficient rainfall.

Identification

R. appendiculatus and *R. zambeziensis* are closely related ticks in the family Ixodidae (hard ticks). Hard ticks have a dorsal shield (scutum) and their mouthparts (capitulum) protrude forward when they are seen from above.

R. appendiculatus and *R. zambeziensis* are both brownish or reddish-brown ticks with short palps. The basis capitulum of *Rhipicephalus* spp. is usually hexagonal and generally inornate. Eyes and festoons are both present and Coxa I is deeply cleft. The spiracular plates are comma-shaped. The males of this genus have adanal shields and usually have accessory shields.

Male *R. appendiculatus* range from 1.8 to 4.4 mm in length. The basis capitulum in the male is variable; the lateral margins may be more or less angled. The scutal punctuations are scattered and of moderate size; they are evenly dispersed in the center, but few or none may be found beyond the lateral grooves and in the lateral fields. The cervical grooves are moderately reticulate or non-reticulate. The posteromedian and para-median grooves are narrow and distinct. The adanal shields are long and have

Rhipicephalus appendiculatus

slightly rounded angles, but can be somewhat variable. Coxa I has a distinctly pointed dorsal projection. The punctuations on female *R. appendiculatus* are small to moderate sized and similar to those of the male. The scutum in the female is approximately equal in length and width; its posterior margin is slightly tapering or abruptly rounded. The lateral grooves are short, poorly defined or absent. The cervical grooves of the female are long and shallow and almost reach the posterolateral margins.

R. zambeziensis closely resembles *R. appendiculatus*, with some subtle differences including a more densely punctate male conscutum and female scutum and a difference in the shape of the female genital aperture, which has posterior broad U-shaped lips in *R. zambeziensis* and broad V-shaped lips in *R. appendiculatus*. Individual specimens may be difficult to definitively assign to either species by morphology and can also be distinguished by molecular methods.

Tick identification to the species level can be difficult, and ticks should be submitted to an expert for identification or confirmation. Both male and female ticks, and ticks from different life stages, should be submitted if they can be found.

Control

Disease Reporting

Veterinarians who encounter or suspect the presence of an exotic tick should follow their national and/or local guidelines for disease reporting. In the U.S., state or federal authorities must be notified immediately.

Prevention

Measures used to exclude exotic ticks from a country include pre-export inspections to certify that the animals are free of ectoparasites, quarantines upon entry, and treatment with acaricides. Three-host ticks, which spend at least 90% of their life cycle in the environment, can be very difficult or impossible to eradicate once they become established in an area.

In endemic regions, acaricides can eliminate *R. appendiculatus* from the animal, but do not prevent reinfestation. Indiscriminate use of acaricides can lead to ticks becoming resistant to these agents, and may also have adverse environmental effects, including incidental effects on other arthropods. Individual measures for tick control include the use of repellents and physical removal. Acquired immune resistance, resulting in decreased tick feeding success, has been demonstrated after repeated exposure to *R. appendiculatus*. In goats, it appeared to be influenced by the animal's breed.

Public Health

R. appendiculatus can feed on humans.

Internet Resources

[Hard Ticks from the University of Edinburgh](#) (photographs)

[University of Bristol. Tick Identification Key](#) (for ticks of veterinary importance).

[World Organization for Animal Health \(WOAH\)](#)

[WOAH Terrestrial Animal Health Code](#)

Acknowledgements

This factsheet was written by Anna Rovid Spickler, DVM, PhD, Veterinary Specialist from the Center for Food Security and Public Health. The U.S. Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS) provided funding for this factsheet through a series of cooperative agreements related to the development of resources for initial accreditation training.

The following format can be used to cite this factsheet. Spickler, Anna Rovid. 2022. *Rhipicephalus appendiculatus*. Retrieved from <http://www.cfsph.iastate.edu/DiseaseInfo/factsheets.php>.

References

- Arthur DR. Ticks and disease. New York: Pergamon Press; 1961. Diagnosis of *Rhipicephalus appendiculatus*; p. 70-3.
- Chitombo L, Lebani K, Sungirai M. Acaricide resistance in *Rhipicephalus appendiculatus* ticks collected from different farming systems in Zimbabwe. Trop Anim Health Prod. 2021;53(4):431.
- Fivaz BH, Rencken I, Cross R, Terry S, Hendry D. Specificity and effects of host resistance on the African tick *Rhipicephalus zambeziensis* (Acarina: Ixodidae). Exp Appl Acarol. 1991;11(2-3):223-32.
- Gopalraj JB, Clarke FC, Donkin EF. Assessment of acquired immune response to *Rhipicephalus appendiculatus* tick infestation in different goat breeds. Onderstepoort J Vet Res. 2013;80(1):614.
- Horak IG, Braack LE, Fourie LJ, Walker JB. Parasites of domestic and wild animals in South Africa. XXXVIII. Ixodid ticks collected from 23 wild carnivore species. Onderstepoort J Vet Res. 2000;67(4):239-50.
- Kahn CM, Line S, editors. The Merck veterinary manual [online]. Whitehouse Station, NJ: Merck and Co; 2006. *Rhipicephalus* spp. Available at: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/72115.htm>. * Accessed 30 Sept 2009.
- Kettle DS. Medical and veterinary entomology. Tucson, AZ: CAB International; 1990. *Rhipicephalus appendiculatus*; p. 472-5.
- Knapp SE, Krecek RC, Horak IG, Penzhorn BL. Helminths and arthropods of black and white rhinoceroses in southern Africa. J Wildl Dis. 1997;33(3):492-502.
- Kolonin GV. Fauna of Ixodid ticks of the world. Moscow; 2009. Genus *Rhipicephalus* Koch, 1844. Available at: <http://www.kolonin.org/17.html>. * Accessed 30 Sept 2009.

Rhipicephalus appendiculatus

- Little S. Arthropod livestock pests and disease vectors. In: Foreign animal diseases. 7th edition. Boca Raton, FL: United States Animal Health Association; 2008. p. 125-35.
- Madder M, Speybroeck N, Bilounga A, Helleputte D, Berkvens D. Survival of unfed *Rhipicephalus appendiculatus* and *Rhipicephalus zambeziensis* adults.. Med Vet Entomol. 2005;19(3):245-50.
- Merial New Zealand. Sheep disease information [online]. Merial; 2001. Parasite profiles: Ticks. Available at: <http://nz.merial.com/farmers/sheep/disease/haema.html>. * Accessed 11 Dec 2006.
- Moyo DZ, Chakuya J, Sungirai M. Ixodid ticks of African buffalo (*Syncerus caffer*), impala (*Aepyceros melampus*) and elephant (*Loxodonta africana*) in five protected park estates in the Zambezi valley, Zimbabwe. Exp Appl Acarol. 2018;75(4):409-17.
- Mtambo J, Madder M, Van Bortel W, Berkvens D, Backeljau T. *Rhipicephalus appendiculatus* and *R. zambeziensis* (Acarina: Ixodidae) from Zambia: a molecular reassessment of their species status and identification. Exp Appl Acarol. 2007;41(1-2):115-28.
- New South Wales Department of Agriculture. Identification of the paralysis tick *I. holocyclus* and related ticks [online]. New South Wales Department of Agriculture; 2001 Feb. Available at: <http://members.ozemail.com.au/~norbertf/identification.htm>. * Accessed 29 November 2001.
- Norval RA, Walker JB, Colborne J. The ecology of *Rhipicephalus zambeziensis* and *Rhipicephalus appendiculatus* (Acarina, Ixodidae) with particular reference to Zimbabwe. Onderstepoort J Vet Res. 1982;49(4):181-90.
- Ochanda H, Young AS, Medley GF, Perry BD. Vector competence of 7 rhipicephalid tick stocks in transmitting 2 *Theileria parva* parasite stocks from Kenya and Zimbabwe. Parasitology. 1998;116 (Pt 6):539-45.
- Spickett AM, Gallivan GJ, Horak IG. The dynamics of questing ticks collected for 164 consecutive months off the vegetation of two landscape zones in the Kruger National Park (1988-2002). Part II. *Rhipicephalus appendiculatus* and *Rhipicephalus zambeziensis*. Onderstepoort J Vet Res. 2011;78(1):233.
- Stachurski F, Tortosa P, Rahajarison P, Jacquet S, Yssouf A, Huber K. New data regarding distribution of cattle ticks in the south-western Indian Ocean islands. Vet Res. 2013;44(1):79.
- Van Heerden J, Mills MG, Van Vuuren MJ, Kelly PJ, Dreyer MJ. An investigation into the health status and diseases of wild dogs (*Lycan pictus*) in the Kruger National Park. J S Afr Vet Assoc. 1995;66(1):18-27.
- Vudriko P, Okwee-Acai J, Tayebwa DS, Byaruhanga J, Kakooza S, et al. Emergence of multi-acaricide resistant *Rhipicephalus* ticks and its implication on chemical tick control in Uganda. Parasit Vectors. 2016;9:4.
- Walker JB, Keirans JE, Horak I. The genus *Rhipicephalus* (Acari, Ixodidae): a guide to the brown ticks of the world. Cambridge, NY: Cambridge University Press; 2000. *Rhipicephalus appendiculatus*; p. 59-71.
- Walker JB, Norval RA, Corwin MD. *Rhipicephalus zambeziensis* sp. Nov., a new tick from eastern and southern africa, together with a redescription of *Rhipicephalus appendiculatus* Neumann, 1901 (Acarina, Ixodidae). Onderstepoort J Vet Res. 1981;48(2):87-104.
- Wilson DD, Bram RA. Foreign pests and vectors of arthropod-borne diseases. In: Foreign Animal Diseases. Richmond, VA: United States Animal Health Association; 1998. Available at: http://www.vet.uga.edu/vpp/gray_book02/fad/fpv.php. * Accessed 11 Dec 2006.
- Zivkovic D, Pegram RG, Jongejan F, Mwase ET. Biology of *Rhipicephalus appendiculatus* and *R. zambeziensis* and production of a fertile hybrid under laboratory conditions. Exp Appl Acarol. 1986;2(4):285-98.

*Link defunct