

Rhipicephalus (*Boophilus*) *annulatus*

Cattle Tick, Cattle Fever Tick,
American Cattle Tick

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Importance

Rhipicephalus annulatus (formerly *Boophilus annulatus*) is a hard tick found most often on cattle. Heavy tick burdens on animals can decrease production and damage hides. *R. annulatus* can also transmit babesiosis (caused by the protozoal parasites *Babesia bigemina* and *Babesia bovis*) and anaplasmosis (caused by *Anaplasma marginale*).

Babesiosis or “cattle fever” was eradicated from the United States between 1906 and 1943, by eliminating its vectors *R. annulatus* and *Rhipicephalus microplus*. Before its eradication, babesiosis cost the U.S. an estimated \$130.5 million in direct and indirect annual losses; in current dollars, the equivalent would be \$3 billion. *R. annulatus* and *R. microplus* still exist in Mexico, and a permanent quarantine zone is maintained along the Mexican border to prevent their reintroduction into the U.S. Within this zone, the USDA’s Animal and Plant Health Inspection Service (APHIS) conducts a surveillance program to identify and treat animals infested with these exotic ticks. Recently, increased numbers of infestations have been recorded in the quarantine zone.

Species Affected

Cattle are the preferred hosts for *R. annulatus*. This tick species is also found occasionally on other large animals including horses, deer and some ungulates exotic to the U.S., as well as on capybaras in South America. It rarely feeds on sheep and goats. *R. annulatus* has been found attached to humans and dogs, but neither is thought to be a suitable maintenance host.

Geographic Distribution

R. annulatus is found in subtropical and tropical regions. This tick is endemic in parts of Africa, the southern regions of the former U.S.S.R., the Middle East, the Near East, the Mediterranean, and parts of South America and Mexico. It has been eradicated from the U.S., but can be sometimes found in Texas or California, in a buffer quarantine zone along the Mexican border.

Life Cycle

R. annulatus is a one-host tick; all stages are spent on one animal. The eggs hatch in the environment and the larvae crawl up grass or other plants to find a host. They may also be blown by the wind. In the summer, *R. annulatus* ticks can survive for as long as 3-4 months without feeding. In cooler temperatures, they may live without food for up to six months. Ticks that do not find a host eventually die of starvation.

Newly attached seed ticks (larvae) are usually found on the softer skin inside the thigh, flanks and forelegs. They may also be seen on the abdomen and brisket. After feeding, the larvae molt twice, to become nymphs and then adults. Each developmental stage (larva, nymph and adult) feeds only once, but the feeding takes place over several days. Adult male ticks become sexually mature after feeding, and mate with feeding females. An adult female tick that has fed and mated detaches from the host and deposits a single batch of many eggs in the environment. Typically, these eggs are placed in crevices or debris, or under stones. The female tick dies after ovipositing. Ticks in the subgenus *Boophilus* have a life cycle than can be completed in 3-4 weeks; this characteristic can result in a heavy tick burden on animals.

Identification

Rhipicephalus annulatus is a member of the family Ixodidae (hard ticks). This tick was formerly known as *Boophilus annulatus*; however, *Boophilus* has recently become a subgenus of the genus *Rhipicephalus*.

Hard ticks have a dorsal shield (scutum) and their mouthparts (capitulum) protrude forward when they are seen from above. *Boophilus* ticks have a hexagonal basis capitulum. The spiracular plate is rounded or oval and the palps are very short, compressed, and ridged dorsally and laterally. Males have adanal shields and accessory shields. The anal groove is absent or indistinct in females, and faint in males. There are no festoons or ornamentation.



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Recommended actions if *Rhipicephalus annulatus* is suspected

Notification of authorities

Suspected or known *R. annulatus* infestations should be reported immediately to state or federal authorities.

Federal: Area Veterinarians in Charge (AVIC):

http://www.aphis.usda.gov/vs/area_offices.htm

State Veterinarians:

<http://www.aphis.usda.gov/vs/sregs/official.html>

Control

In the U.S., *R. annulatus* and *R. microplus* incursions are controlled by USDA APHIS Fever Tick Eradication Program personnel, including mounted inspectors called "tick riders." Tick riders patrol the Rio Grande river, inspect ranches in the quarantine zone, and apprehend stray and smuggled livestock from Mexico. Before being moved from the quarantine zone, cattle and horses must be inspected and given a precautionary treatment with acaricides.

Farms and ranches with *R. annulatus* infestations are placed under quarantine for 6 to 9 months, depending on the time of the year. A single acaricide treatment can destroy all of the ticks on an animal, but will not prevent reinfestation. There are two options for treating infested and exposed cattle. These animals may be dipped at regular intervals for 9 months. Alternatively, they may be treated until they are "tick free" before two consecutive acaricide treatments, then removed from the infected pasture. The infested pasture must remain free of all livestock for 6-9 months or longer, to break the tick life cycle. Deer and exotic ungulates may maintain the ticks on vacated pastures; ivermectin-based feed and pesticide treatment protocols have been established to treat wild animals visiting the field. *R. annulatus* can become resistant to acaricides.

Public Health

R. annulatus can transmit babesiosis to susceptible (usually splenectomized) humans.

Internet Resources

Acarology WWW Home Page

http://www.nhm.ac.uk/hosted_sites/acarology/

Food and Agriculture Organization of the United Nations (FAO). Ticks and Tick-borne Diseases.

<http://www.fao.org/WAICENT/faoInfo/Agricult/AGA/AGAH/PD/pages/DEFAULT.HTM>

The Merck Veterinary Manual

<http://www.merckvetmanual.com/mvm/index.jsp>

The University of Edinburgh. The Tick Collection.

<http://www.nhc.ed.ac.uk/index.php?page=24.25.121>

Tick Identification Key

<http://webpages.lincoln.ac.uk/fruedisueli/FR-webpages/parasitology/Ticks/TIK/tick-key/index.htm>

United States Animal Health Association. Foreign Animal Diseases.

http://www.vet.uga.edu/vpp/gray_book02/fad/index.php

United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA APHIS)

<http://www.aphis.usda.gov>.

World Organization for Animal Health (OIE)

<http://www.oie.int>

OIE International Animal Health Code

http://www.oie.int/eng/normes/mcode/A_summry.htm

References

- Corwin RM, Nahm J. *Boophilus* spp [online]. University of Missouri, College of Veterinary Medicine; 1997. Available at: <http://www.parasitology.org/Arthropods/Arachnida/Boophilus.htm>.* Accessed 2001 Nov 29.
- Estrada-Pena A, Bouattour A, Camicas JL, Guglielme A, Horak I, Jongejan F, Latif A, Pegram R, Walker AR. The known distribution and ecological preferences of the tick subgenus *Boophilus* (Acari: Ixodidae) in Africa and Latin America. *Exp Appl Acarol*. 2006;38:219-235.
- Figueiredo LT, Badra SJ, Pereira LE, Szabo MP. Report on ticks collected in the Southeast and Mid-West regions of Brazil: analyzing the potential transmission of tick-borne pathogens to man. *Rev Soc Bras Med Trop*. 1999;32:613-619.
- Food and Agriculture Organization of the United Nations [FAO]. *Boophilus* [online]. FAO; 1998. Available at: <http://www.fao.org/WAICENT/faoInfo/Agricult/AGA/AGAH/PD/pages/ticksp4.htm>. Accessed 15 Feb 2007.
- Gray JH, Payne RL, Schubert GO, Garnett WH. Implication of white-tailed deer in the *Boophilus annulatus* tick eradication program. *Proc Annu Meet U S Anim Health Assoc*. 1979;(83):506-515.
- Horak IG, Camicas JL, Keirans JE. The Argasidae, Ixodidae and Nuttalliellidae (Acari: Ixodida): a world list of valid tick names. *Exp Appl Acarol*. 2002;28:27-54.
- Kahn CM, Line S, editors. The Merck veterinary manual [online]. Whitehouse Station, NJ: Merck and Co; 2003. *Boophilus* spp. Available at: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=html/bc/72108.htm>. Accessed 15 Feb 2007.
- Kahn CM, Line S, editors. The Merck veterinary manual [online]. Whitehouse Station, NJ: Merck and Co; 2003. Ticks: Introduction. Available at: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=html/bc/72100.htm>. Accessed 15 Feb 2007.

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- Kahn CM, Line S, editors. The Merck veterinary manual [online]. Whitehouse Station, NJ: Merck and Co; 2003. Tick control. Available at: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/72120.htm>. Accessed 15 Feb 2007.
- Linthicum KJ, Bailey CL. Ecology of Crimean-Congo hemorrhagic fever. Biology of ticks. Host preferences. In: Sonenshine DE, Mather TN, editors. Ecological dynamics of tick-borne zoonoses. New York: Oxford University Press; 1994. p 423.
- New South Wales Department of Agriculture. Identification of the paralysis tick *I. holocyclus* and related ticks. New South Wales Department of Agriculture; 2001 Feb. Available at: <http://members.ozemail.com.au/~norbert/identification.htm>. *Accessed 29 Nov 2001.
- Pelzel AM (APHIS Area Epidemiology Officer). Cattle fever tick surveillance in Texas. NAHSS Outlook [online]. USDA APHIS; 2005 Aug. Available at: http://www.aphis.usda.gov/vs/ceah/ncahs/nsu/outlook/issue7/cattle_fever_tick_surveillance.pdf. Accessed 15 Feb 2007.
- United States Department of Agriculture [USDA] Animal and Plant Health Inspection Service [APHIS]. Controlling cattle fever ticks [online]. USDA APHIS; 2002 Feb. Available at: http://www.aphis.usda.gov/lpa/pubs/fsheet_faq_notice/fs_ahcfever.html. Accessed 15 Feb 2007.

*Link defunct as of February 2007