

Rhipicephalus (Boophilus) microplus

Southern Cattle Tick,
Cattle Tick

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IOWA STATE UNIVERSITY
College of Veterinary Medicine



- OIE Collaborating Centres:
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Importance

Rhipicephalus microplus (formerly *Boophilus microplus*) is considered to be the most important tick parasite of livestock in the world. *R. microplus* is a hard tick that can be found on many hosts including cattle, buffalo, horses, donkeys, goats, sheep, deer, pigs, dogs and some wild animals. Heavy tick burdens on animals can decrease production and damage hides. *R. microplus* can also transmit babesiosis (caused by the protozoal parasites *Babesia bigemina* and *Babesia bovis*) and anaplasmosis (caused by *Anaplasma marginale*). Under experimental conditions, this tick can transmit *Babesia equi*, the cause of equine piroplasmiasis.

Babesiosis or “cattle fever” was eradicated from the United States between 1906 and 1943, by eliminating its vectors *R. microplus* and *Rhipicephalus annulatus*. 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. microplus* and *R. annulatus* 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

R. microplus mainly infests cattle, deer and buffalo, but it can also be found on horses, goats, sheep, donkeys, dogs, pigs and some wild mammals.

Geographic Distribution

R. microplus can be found worldwide in subtropical and tropical regions. This tick is endemic in the Indian region, much of tropical and subtropical Asia, northeastern Australia, Madagascar, southeastern Africa, the Caribbean, and many countries in South and Central 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. microplus 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. microplus* can survive for as long as 3 to 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 places 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 that can be completed in 3 to 4 weeks; this characteristic can result in a heavy tick burden on animals.

Identification

Rhipicephalus microplus is a member of the family Ixodidae (hard ticks). This tick was formerly known as *Boophilus microplus*; 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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R. microplus adults have a short, straight capitulum. The legs are pale cream and there is a wide space between first pair of legs and the snout. The body is oval to rectangular and the shield is oval and wider at the front. The snout is short and straight.

The nymphs of this species have an orange-brown scutum. The body is oval and wider at front. The body color is brown to blue-gray, with white at the front and sides.

R. microplus larvae have a short, straight capitulum and a brown to cream body. Larvae have six legs instead of eight.

Recommended actions if *Rhipicephalus microplus* is suspected

Notification of authorities

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

Federal: Area Veterinarians in Charge (AVIC):

https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/contact-us/CT_Vet_Acred_Assst_DD

State Animal Health Officials:

http://www.usaha.org/upload/Federal%20and%20State%20Health/StateAnimalHealthOfficials_rev.pdf

Control

In the U.S., *R. microplus* and *R. annulatus* 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. microplus* 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 nine months. Alternatively, they may be treated until they are “tick free” before two consecutive acaricide treatments, then removed from the infested pasture. The infested pasture must remain free of all livestock for 6 to 9 months or longer, to break the tick life cycle. Deer may maintain the ticks on vacated pastures; ivermectin-based feed and pesticide treatment protocols have been established to treat wild animals visiting the field.

In regions where this tick is endemic, control methods include acaricide treatment, pasture rotation, environmental modification, and integrated biologic and chemical control strategies. Acaricide resistance is common in the *Boophilus* subgenus of ticks. The use of resistant breeds is an important means of tick control in some countries. European (*Bos taurus*) breeds of cattle usually remain fairly

susceptible to ixodid ticks, even after multiple exposures. However, some cattle breeds such as Zebu (*Bos indicus*) and some Zebu crosses generally become resistant to *B. microplus* after exposure. Vaccines against *R. microplus* have recently been introduced.

Public Health

R. microplus can spread 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>

The University of Edinburgh. The Tick Collection.

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

United States Animal Health Association. Foreign Animal Diseases.

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

USDA APHIS

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

World Organization for Animal Health (OIE)

<http://www.oie.int>

OIE Terrestrial Animal Health Code

<http://www.oie.int/international-standard-setting/terrestrial-code/access-online/>

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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, Guglielmo 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.
- 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=htm/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=htm/bc/72100.htm>. Accessed 15 Feb 2007.
- 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.
- 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/~norbertf/identification.htm>. * Accessed 29 Nov 2001.
- New South Wales Department of Agriculture. Larval stages of the paralysis tick *Ixodes holocyclus*, the cattle tick *Boophilus microplus* and the bush tick *Haemaphysalis longicornis*. New South Wales Department of Agriculture; 2001 Feb. Available at: <http://members.ozemail.com.au/~norbertf/larvae.htm>. * Accessed 29 Nov 2001.
- New South Wales Department of Agriculture. Nymphal stages of the paralysis tick *Ixodes holocyclus*, the cattle tick *Boophilus microplus* and the bush tick *Haemaphysalis longicornis*. New South Wales Department of Agriculture; 2001 Feb. Available at: <http://members.ozemail.com.au/~norbertf/nymphs.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.
- Rajput ZI, Hu SH, Chen WJ, Arijo AG, Xiao CW Importance of ticks and their chemical and immunological control in livestock. *J Zhejiang Univ Sci B*. 2006;7:912-21.
- 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.

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