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Amblyomma variegatum

Tropical Bont Tick
Tropical African Bont Tick

Amblyomma variegatum is a hard tick that feeds on a number of domesticated animals including cattle, sheep, goats, horses and dogs, as well as humans. The long mouthparts of *A. variegatum* leave large wounds, and make this tick difficult to remove manually. Its bite is severe and painful, and can result in significant damage to the skin. Secondary infections can cause septic wounds or abscesses, and inflammation on the teats of cows may affect milk production. In some regions, *Amblyomma* bite wounds may become infested by screwworms. In addition, *A. variegatum* is a host for a number of microbial pathogens including *Ehrlichia ruminantium* (formerly *Cowdria ruminantium*), the agent of heartwater, and *Rickettsia africae*, the agent of African tick-bite fever, which is an emerging zoonosis in rural sub-Saharan Africa and the Caribbean.

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Overview

- Organism
- Identification
- Importance
- Geographic Distribution
- Life Cycle
- Associated Diseases
- Prevention and Control
- Recommended Actions

www.cdc.gov/nczod/diseases/zoonotic/ticks/amblyomma/

In today's presentation we will cover information regarding the tick *Amblyomma variegatum* and the diseases it can transmit. We will also talk about how to identify the tick, and the impact this tick has had in the past and could have in the future. Additionally, we will talk about how it is transmitted and the species it affects. Finally, we will address prevention and control measures, as well as actions to take if *Amblyomma variegatum* is suspected.

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Organism

- *Amblyomma variegatum*
- Hard tick
 - Family Ixodidae
- Three-host tick
- Hosts
 - Small mammals, birds, reptiles
 - Cattle, sheep, goats
- Can feed on humans



Amblyomma variegatum is a hard tick in the family Ixodidae. It is a three-host tick. Immature ticks feed on small mammals, ground-feeding birds, reptiles, cattle, sheep and goats. Adult ticks prefer cattle, but can also be found on sheep, goats, horses, camels, dogs and some large wildlife including antelope. *A. variegatum* can feed on humans.

[Photo shows an *Amblyomma variegatum* adult tick. Source: A Walker/www.common.wikimedia.org]

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Identification

- Dorsal scutum
- Mouthparts protrude
- Fестоons
- Color variation
 - Female: brown
 - Male: orange, brightly ornamented
- Submit ticks for identification



Hard ticks have a dorsal shield (scutum) and their mouthparts (capitulum) protrude forward when they are seen from above. *Amblyomma* ticks are large ticks with long, strong mouthparts. The palps are long; the second segment is twice as long as it is wide. Eyes are present and the festoons are well developed. The males have no adanal shields, accessory shields or subanal shield. Female *A. variegatum* are brown, but the males are brightly ornamented with orange. When they are engorged, the adult female ticks are about the size of a nutmeg. Tick identification to the species level can be difficult, and ticks should be submitted to an expert for identification whenever possible.

[This drawing depicts some of the anatomic characteristics displayed by ticks that are members of the genus *Amblyomma*. Source: CDC Public Health Image Library]

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Importance

- Feeds on livestock and humans
- Painful bites result in large wounds
 - Secondary infection
 - Infestation (e.g., screwworm)
- Pathogens transmitted
 - *Ehrlichia ruminantium*
 - *Rickettsia africae*

Amblyomma variegatum feeds on a number of domesticated animals including cattle, sheep, goats, horses and dogs, as well as humans. The long mouthparts of *A. variegatum* leave large wounds, and make this tick difficult to remove manually. Its bite is severe and painful, and can result in significant damage to the skin. Secondary infections can cause septic wounds or abscesses, and inflammation on the teats of cows may affect milk production. In some regions, *Amblyomma* bite wounds may become infested by screwworms. *A. variegatum* is a host for a number of microbial pathogens including *Ehrlichia ruminantium* (formerly *Cowdria ruminantium*), the agent of heartwater, and *Rickettsia africae*, the agent of African tick-bite fever.

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Geographic Distribution

- Tropics and subtropics
 - Sub-Saharan Africa
 - Southern Arabia
 - Caribbean



A. variegatum is found in the tropics and subtropics. This tick is endemic in savannas in many countries in sub-Saharan Africa, as well as in southern Arabia, the Caribbean, and some islands in the Atlantic and Indian Oceans. An eradication program is in progress in the Caribbean; St. Kitts, St. Lucia, Montserrat, Anguilla, Barbados and Dominica qualified for ‘provisionally free’ certification by 2002, although St. Kitts was re-infested in 2004.

[This photo shows an *Amblyomma variegatum* adult tick. Source: Florida Department of Health]

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Life Cycle

- Three-host tick
 - Adult ticks feed on third host
 - Drop to ground to lay eggs
 - Eggs hatch and become larvae
 - Larvae attach to first host
 - Leave first host and molt into nymphs
 - Nymphs attach to second host
 - Nymphs drop off and molt into adults
 - Adults attach to third host

A. variegatum is a three-host tick. These ticks can be found on the host for several days while they feed, then they drop to the ground. Adult ticks prefer cattle, but can also be found on other livestock including camels, as well as dogs and some wildlife. The adult ticks are usually found on the relatively hairless parts of the body; most are located on the ventral body surface and the genitalia, or under the tail. Adult *A. variegatum* feed mainly in the rainy season, while the immature ticks feed primarily during the dry season. Females lay eggs that become larvae. Larvae attach to the first host, then drop off and become nymphs. Nymphs attach to the second host. Later, the nymphs drop off and molt into adults. Immature ticks feed on small mammals, ground feeding birds and reptiles, as well as cattle, sheep and goats.

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Associated Diseases

- *Ehrlichia ruminantium*
 - "Heartwater"
 - Mainly affects ruminants
 - Diarrhea, neurological signs, hydropericardium
- *Rickettsia africae*
 - Emerging zoonosis
 - Fever, nausea, headache, muscle pain
 - Eschar at bite site

Diseases associated *A. variegatum* include: Heartwater, a rickettsial disease of ruminants, which is one of the most important diseases of livestock in Africa. This tick-borne illness can significantly decrease productivity in regions where it is endemic. The symptoms begin with a sudden fever, anorexia, listlessness and dyspnea. Some animals, particularly cattle, may also develop diarrhea. These symptoms are followed by neurological signs. Hydropericardium, with straw-colored to reddish pericardial fluid, gives heartwater its name. *Rickettsia africae* is the agent of African tick-bite fever, which is an emerging zoonosis in rural sub-Saharan Africa and the Caribbean; it causes fever, nausea, fatigue, headache, muscle pain, and neck stiffness. Eschars may occur at the bite site.

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Prevention and Control

- Exclude exotic ticks
 - Pre-export inspection of animals
 - Animals certified-free of ectoparasites
 - Quarantine upon entry
- Acaricide treatment
- Three-host ticks
 - Difficult to eradicate
 - Environmental control



Measures used to exclude exotic ticks from a country include pre-export inspection and certification that the animals are free of ectoparasites, quarantines upon entry, and treatment with acaricides. In countries where *A. variegatum* is already present, acaricides can eliminate the ticks from the animal, but do not prevent reinfestation and must be repeated periodically. Three-host ticks spend at least 90% of their life cycle in the environment rather than on the host animal; ticks in the environment must also be controlled to prevent their spread. If ticks are already widespread in a region, eradication can be difficult. The Caribbean eradication program is based on animal identification and mandatory periodic acaricide treatment of livestock by farmers, as well as public education, surveillance, quarantines and movement restrictions.

[This photo shows a cow wading through an ectoparasitic dip. Source: Scott Bauer/U.S. Department of Agriculture]

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Recommended Actions

- IMMEDIATELY notify authorities
 - Federal
 - Area Veterinarian in Charge (AVIC)
 - http://www.aphis.usda.gov/animal_health/area_offices/
 - State
 - State Animal Health Officials (SAHO)
 - www.usaha.org/Portals/6/StateAnimalHealthOfficials.pdf
- Quarantine

If you suspect *A. variegatum*, state or federal authorities should be notified immediately. Animals suspected infested *A. variegatum* with should be isolated, and the farm should be quarantined until definitive diagnosis is determined.

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Additional Resources

- Center for Food Security and Public Health
 - www.cfsph.iastate.edu
- USAHA Foreign Animal Diseases ("The Gray Book")
 - www.aphis.usda.gov/emergency_response/downloads/nahems/fad.pdf

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