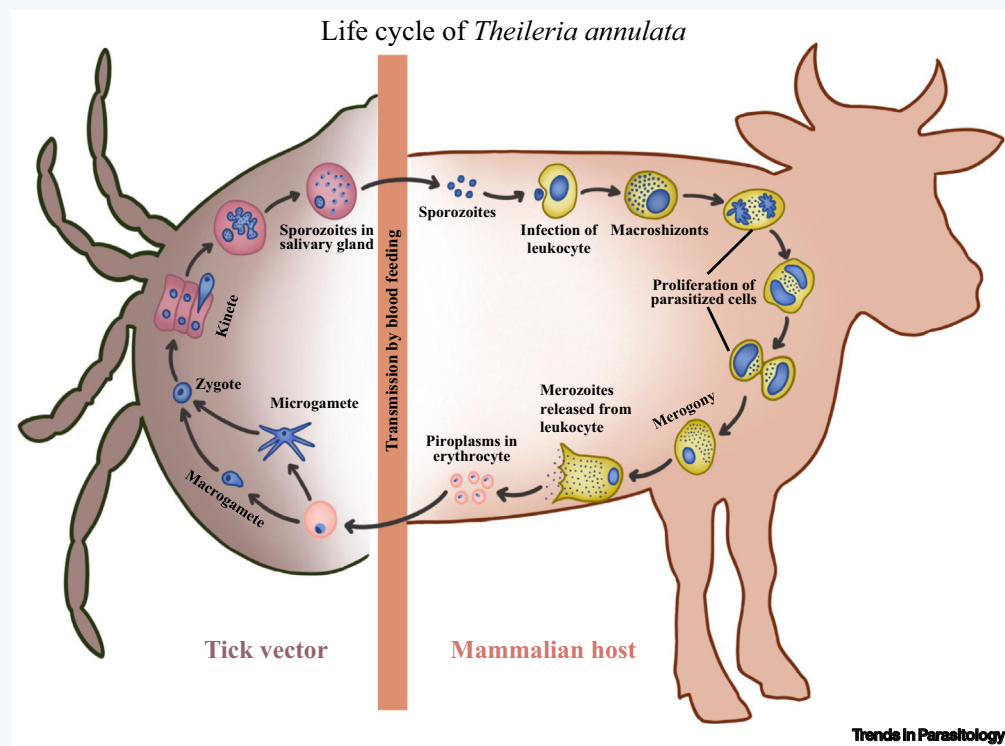


Theileria annulata

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KEY FACTS:

T. annulata reproduction includes asexual and sexual patterns. The stages of schizogony, merogony, and sporogony occur via an asexual model for reproduction. Sexual reproduction occurs in the tick gut lumen.

Infected host lymphocytes can be easily cultured *in vitro*; but the replication of cells is reversible upon drug-induced parasite clearance.

There are three genomes: a nuclear genome (8.35 Mb encoding 3792 genes); a mitochondrial genome (6.6 kb); and an apicoplast genome.

T. annulata is only transmitted by ticks of the genus *Hyalomma* via transstadial transmission.

DISEASE FACTS:

T. annulata infection occurs in large ruminants, including cattle, yaks, water buffalos, and camels.

Local low-producing *Bos indicus* cattle are resistant to clinical disease, while exotic high-producing European *Bos taurus* breeds are susceptible.

Clinical signs of tropical theileriosis in the early stage are fever, dyspnea, and swelling of the superficial lymph nodes. Anemia and icterus are more prominent during the later stages of infection.

Detection of parasites in Giemsa-stained red blood cells and lymph node smears by microscopy is necessary for diagnosis, especially for acute infection.

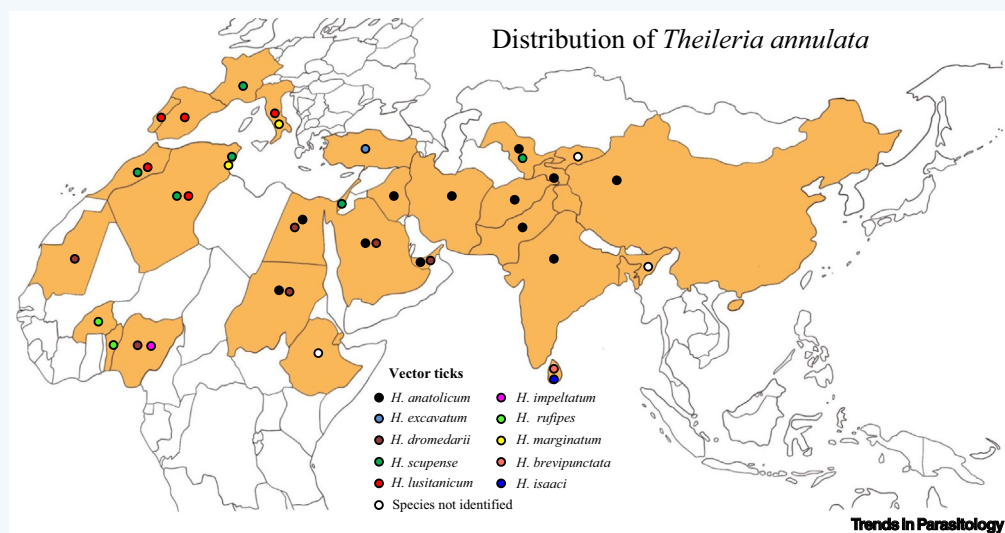
Animals with subclinical infections could act as reservoirs for tick infection and disease spread.

TAXONOMY AND CLASSIFICATION:

- PHYLUM:** Apicomplexa
- CLASS:** Aconoidasida
- ORDER:** Piroplasmida
- FAMILY:** Theileriidae
- GENUS:** *Theileria*
- SPECIES:** *T. annulata*

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Theileria annulata is a tick-transmitted parasite that causes tropical theileriosis. It is distributed widely across southern Europe, north Africa, and Asia, where approximately 250 million cattle are at risk of *T. annulata* infection. The parasite's life cycle contains a sexual phase in tick vectors and asexual developmental stages in mammalian hosts. After invading host leukocytes, the parasites reprogram many host signaling pathways and induce replication via poorly understood molecular mechanisms. Within red blood cells, multiplication of *T. annulata* causes anemia that could aggravate the pathology of the disease. Buparvaquone is an effective drug for treating tropical theileriosis at the early infection stage; however, the relatively high cost limits its application worldwide. Currently, low-pathogenicity parasites derived from infected cells *in vitro* are used as vaccines in many countries.



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Declaration of interests

The authors declare no competing interests.

Resources

www.oie.int/en/disease/theileriosis/

<https://piroplasmadb.org/piro/app>

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