

BOVINE THEILERIOSIS

| ANIMAL GROUP AFFECTED | TRANSMISSION | CLINICAL SIGNS | FATAL DISEASE ? | TREATMENT | PREVENTION & CONTROL |
|-----------------------|--------------|---|-----------------|---|--|
| Bovine | Tick-borne | Lymphoproliferative diseases, characterized by fever, leucopenia and/or anaemia | Yes | Parvaquone (Parvexon) Buparvaquone (Butalex) | <i>In houses</i> Tick control <i>in zoos</i> Tick control |

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| Fact sheet compiled by J. Brandt, Royal Zoological Society of Antwerp, Belgium | Last update February 2009 |
| Fact sheet reviewed by F. Vercammen, Royal Zoological Society of Antwerp, Belgium D. Geysen, Animal Health, Institute of Tropical Medicine, Antwerp, Belgium | |
| Susceptible animal groups <i>Theileria parva</i> : cattle, African Buffalo* (<i>Syncerus caffer</i>) and Waterbuck (<i>Kobus defassa</i>). <i>T.annulata</i> : cattle, yak (<i>Bos grunniens</i>) and waterbuffalo* (<i>Bubalus bubalis</i>). <i>T.mutans</i> : cattle* and buffalo*. <i>T.taurotragi</i> : cattle, sheep, goat and eland (<i>Taurotragus oryx</i> - natural host). <i>T.velifera</i> : cattle* and buffalo*. <i>T.orientalis/buffeli</i> : cattle * = usually benign | |
| Causative organism Several species belonging to the phylum of the Apicomplexa, order Piroplasmida, family Theileriidae. Pathogenic species are <i>T.parva</i> (according to the strain: East Coast Fever, Corridor Disease, Buffalo Disease, January Disease, Turning Sickness). <i>T.annulata</i> (Tropical theileriosis, Mediterranean theileriosis). <i>T.taurotragi</i> (Turning Sickness). Other species, i.a. <i>T.mutans</i> , <i>T.orientalis/buffeli</i> , <i>T.velifera</i> are considered to be less or non pathogenic. | |
| Zoonotic potential <i>Theileria</i> species of cattle have no zoonotic potential unlike <i>Theileria (Babesia) microti</i> , an American species in rodents which can infect humans | |
| Distribution Buffalo and cattle associated <i>T.parva</i> occurs in Eastern and Southern Africa (from S.Sudan to S.Zimbabwe). <i>T.annulata</i> in N.Africa, Sudan, Eritrea, Mediterranean Europe, S. Russia, Near & Middle East, India, China and Central Asia. Oriental theileriosis (<i>T.orientalis/buffeli</i>) has a cosmopolitan distribution (N.America, Europe Asia, and Australia). Other (benign) theilerioses are widespread in sub-Saharan Africa with <i>T.mutans</i> also in some Caribbean islands. | |
| Transmission <i>T.parva</i> and <i>T.taurotragi</i> are (transstadially) transmitted by ticks of the genus <i>Rhipicephalus</i> (principally <i>R.appendiculatus</i> and <i>R.zambeziensis</i>). <i>T.annulata</i> is transmitted by 2- and 3- host <i>Hyalomma</i> ticks; <i>T.mutans</i> by <i>Amblyomma</i> spp. and <i>T.orientalis/buffeli</i> by <i>Haemaphysalis</i> spp. | |
| Incubation period Incubation times depend on the challenge i.a. number of infected ticks. In general short: 10 to 25 days for <i>T.parva</i> , 15 to 25 days for <i>T.annulata</i> and occasionally for <i>T.taurotragi</i> . In the rare event of benign <i>Theileria</i> causing disease, incubation varies between 3 to 5 weeks from the time of attachment of the ticks. | |
| Clinical symptoms <i>T.parva</i> and <i>T.annulata</i> : mostly subclinical in buffalo but very pathogenic in cattle. Fever, swelling of the superficial lymphnodes (for <i>T.parva</i> : this starts with the <i>lInn. parotideus superficialis</i>) lethargy after some days and sometimes anorexia and lachrymation; often constipation followed by diarrhoea. Dyspnoea in the terminal stage. Progressive anaemia (icterus and brown urine for <i>T.annulata</i>). For other (benign) <i>Theileria</i> spp. if any pathogenic symptoms, usually anaemia related and nervous symptoms for <i>T.taurotragi</i> . | |
| Post mortem findings Disease in <i>T.parva</i> and <i>T.annulata</i> is related to the schizont stages <i>T</i> multiplying in T&B cells (<i>T.parva</i>) and macrophages (<i>T.annulata</i>) causing lymphocytosis with massive invasion of infected lymphoblasts in all tissues followed by lymphocytolysis. Piroplasm stages in red blood cells are multiplying (<i>T.annulata</i>) which contributes to anaemia. Hence pneumonia with pulmonary oedema, high amounts of exudate in thoracic and | |

abdominal cavity. Hyperplasia of lymphoid tissues (sometimes enlarged thymus, spleen and liver) with disseminated haemorrhages: often ulcerations of the abomasum, haemorrhagic striping of the mucosa of the caecum (*T.parva*). Lymphoproliferative spots (pseudo-infarcti) of the renal cortex and myocard. Petechiae and haemorrhages of epi-, endo- and myocard frequent for *T.annulata*.

Diagnosis

Direct diagnosis (*T.parva* & *T.annulata*): detection of schizonts in smears from biopsies of superficial lymphnodes (May-Grünwald Giemsa staining). Parasitaemia (erythrocytic merozoites) some days after infection, usually abundant for *T.annulata*. May persist for months after recovery. Indirect diagnosis is largely based on the indirect fluorescent antibody test (IFAt) with in vitro derived lymphoblast schizont antigen. Whole bloodspots on filterpaper Whatman Nr. 3 or 4. PCR and Elisa haven been developed, the former equally to detect the parasites in ticks.

Material required for laboratory analysis

Smears from biopsies from enlarged lymphnodes (only for *T.parva*, *T.annulata* and *T.taurotragi*). Thin blood smears or EDTA-anticoagulated blood
Parasitaemias in latent infections are often too low to be detected.

OIE Reference Laboratory

- **Dr Dirk Geysen**
Department of Animal Health, Institute of Tropical Medicine
Nationalestraat 155, 2000 Antwerpen
BELGIUM
Tel: (32.3) 247.62.66 Fax: (32.3) 247.62.68
Email: dgeysen@itg.be

Treatment

Parvaquone "Bimeda" i.m. 20 mg/kg b.w. Buparvaquone "Butalex" i.m. 5 mg/kg b.w.
Halofuginone "Terit" p.o. 1 mg/kg b.w.

Prevention and control in zoos

Tick control by acaricidal treatment or immunization by infection & treatment (with Terramycin LA) in domestic animals might be superfluous in a supposedly tick free environment of the zoo, but specific attention to tick prevention in imported animals is recommended.

Suggested disinfectant for housing facilities
Notification
Guarantees required under EU Legislation
Guarantees required by EAZA Zoos
Measures required under the Animal Disease Surveillance Plan
Measures required for introducing animals from non-approved sources
Measures to be taken in case of disease outbreak or positive laboratory findings
Conditions for restoring disease-free status after an outbreak
Contacts for further information



References

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