

# Babesiosis and Theileriosis – World Perspective

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## Geographical distribution

Equine babesiosis (caused by *Babesia caballi*) and theileriosis (caused by *Theileria equi*) are widely distributed in tropical and subtropical regions, and to a lesser extent, they occur in temperate countries as well. These diseases occur in South and Central America, the Caribbean, Africa, the Middle East, and Eastern and Southern Europe. The United States, Canada, Australia, Japan, England, Iceland, and Ireland are not considered to be endemic areas.

The official information on distribution and prevalence of equine piroplasmosis and theileriosis obtained from the website of OIE is very limited. From 2005 to 2010, only two countries (USA and Ireland) submitted reports on confirmed cases. On the other hand, several scientific articles were published in the same period which described either cases with clinical signs or cases diagnosed by serological and other tests in many different countries (e.g. Argentina, Brazil, Cuba, France, Ghana, Greece, Hungary, India, Iran, Iraq, Italy, Jordan, Netherlands Antilles, Pakistan, Puerto Rico, South Africa, Trinidad and Tobago, Turkey, and United Arab Emirates). Based on these facts, it is supposed that the prevalence of these protozoan diseases is significantly higher than the number of suspected and/or confirmed cases.

## Clinical signs

The incubation period is usually between 7 and 22 (30) days. These protozoan infections can manifest as a peracute, acute or subacute/chronic disease. The clinical signs are variable and often non-specific. Clinical disease caused by *B. caballi* usually lasts a few days to a few weeks, and the mortality rate is low. *T. equi* causes a more severe clinical course, and the infected horses may die within 1 to 2 days of initial signs.

In rare peracute cases, horses can be found dead or dying. The disease more often presents as an acute infection, with usually high fever (usually exceeds 40 °C), elevated heart and pulse rates, inappetence, malaise, dyspnoea, congestion of the mucous membranes, and small, dry faecal balls. Anaemia, jaundice, petechial haemorrhages on the conjunctiva, sweating, a swollen abdomen, haemoglobinuria, and posterior weakness may be also seen. Subacute cases may have a fever (sometimes intermittent), lack of appetite, malaise, weight loss, signs of mild colic, and mild oedema of the distal limbs. The mucous membranes can be pale pink or yellow, and may show petechiae or ecchymoses. In more chronic cases, common symptoms include a decreased appetite, exercise intolerance, weight loss, transient fevers, and an enlarged spleen on rectal palpation. Foals infected in utero are usually weak at birth, and rapidly develop anaemia and severe icterus.

Horses that survive the acute phase of infection continue to carry the parasites for long periods of time. Animals infected by *B. caballi* may clear the babesia spontaneously after 12 to 42 months, but horses with *T. equi* infection do not appear to clear the organism spontaneously. These horses are potential sources of infection to

other horses through tick-borne transmission or mechanical transfer by ticks, needles, or surgical instruments.

Infected animals develop an effective active immunity which depends on the continuing presence of the organism. Cross-protection between *B. caballi* and *T. equi* probably does not exist.

### **Differential diagnosis**

The most important differential diagnoses include equine infectious anaemia, African horse sickness, equine viral arteritis, leptospirosis (*L. pomona*, *L. gryppotyphosa*, *L. hardjo*, *L. canicola*), Surra, purpura haemorrhagica, autoimmune haemolytic anaemia, neonatal isoerythrolysis in foals, snake bites, and plant toxicities (onion, red maple leaf).

### **Clinical diagnosis**

The disease should be suspected in horses with anaemia, icterus, and fever. The infection can be diagnosed by identification of the organisms in Giemsa stained blood or organ smears. *B. caballi* merozoites are joined at their posterior ends, while *T. equi* merozoites are often connected in a tetrad or “Maltese cross”. Organisms can often be found in acute infections, but may be very difficult to find in carrier animals. In carriers, thick blood films can sometimes be helpful.

Further details on serological and other diagnostic methods will be provided by Professor R. Farkas.

### **Treatment**

Treatment options may vary depending on the location of the horse and the desired goal of the intervention. In horses which are kept in endemic areas, suppressing clinical signs without eliminating the parasite from the body is desirable, because premunition depends on the continuous presence of the organism at a low level.

The most widely used drug in the treatment of these parasitic diseases is imidocarb dipropionate. The recommended dose for *B. caballi* infection is 2.0-2.2 mg/kg intramuscularly once daily for two days. The elimination of *T. equi* from the horse is more difficult. Four doses of the above-mentioned drug at 4.0-4.4 mg/kg intramuscularly at 72-hour intervals are recommended, but this regime had variable efficacy in eliminating the carrier state.

Potential side effects of imidocarb administration may include salivation, colic and intestinal hypermotility.

Other drugs which can be effective are buparvaquone and diminazene aceturate. The recommended dosages are 6 mg/kg and 3.5 mg/kg intramuscularly repeated after 48 hours, respectively.

### **OIE recommendations for importation of horses**

Veterinary authorities of importing countries should require the presentation of an international veterinary certificate attesting that the animals:

1. showed no clinical sign of equine piroplasmiasis on the day of shipment;
2. were subjected to diagnostic tests for equine piroplasmiasis (*Theileria equi* and *Babesia caballi*) with negative results within 30 days prior to shipment;

3. were maintained free from ticks, by preventive treatment when necessary, during the 30 days period prior to shipment.

Veterinary authorities of importing countries should consider the possibility of importing competition horses on a temporary basis and which are positive to the testing procedure referred to in point 2 (see above) under the following safeguards:

1. the horses are accompanied by an official OIE approved passport;
2. the veterinary authorities of importing countries require the presentation of an international veterinary certificate attesting that the animals:
  - a) showed no clinical sign of equine piroplasmosis on the day of shipment;
  - b) were treated against ticks within 7 days prior to shipment;
3. the horses are kept in an area where necessary precautions are taken to control ticks and that is under the direct supervision of the veterinary authority;
4. the horses are regularly examined for the presence of ticks under the direct supervision of the veterinary authority.

### **Online References**

OIE Terrestrial Animal Health Code 2009

[http://www.oie.int/eng/normes/mcode/en\\_INDEX.HTM](http://www.oie.int/eng/normes/mcode/en_INDEX.HTM)

OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2009

[http://www.oie.int/eng/normes/mmanual/A\\_INDEX.HTM](http://www.oie.int/eng/normes/mmanual/A_INDEX.HTM)

OIE World Animal Health Information Database

<http://www.oie.int/wahis/public.php?page=home>

United States Department of Agriculture, Animal and Plant Health Inspection Service

[http://www.aphis.usda.gov/animal\\_health/animal\\_diseases/piroplasmosis/index.shtml](http://www.aphis.usda.gov/animal_health/animal_diseases/piroplasmosis/index.shtml)

The Center for Food Security and Public Health, Iowa State University

[http://www.cfsph.iastate.edu/Factsheets/pdfs/equine\\_piropalmsosis.pdf](http://www.cfsph.iastate.edu/Factsheets/pdfs/equine_piropalmsosis.pdf)

Further references are available from the author upon request.