

Bovine anaemia caused by *Theileria orientalis* group

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Introduction

Theileria are protozoan parasites carried by ticks. When ticks carrying *Theileria* feed on cattle, the parasite gets into their bloodstream and enters red blood cells. In some animals, sufficient red blood cells are destroyed to cause anaemia- a reduction in the red blood cell numbers. This reduces the ability of blood to carry oxygen and makes the animal ill.

A protozoan referred to as *Theileria buffeli* has been present in Australia for around 100 years. It has been seen occasionally in blood smears of cattle from “ticky” country, but seldom caused any illness. It was considered a benign infection.

In recent years, there has been an increase in the number of animals with disease caused by *Theileria*. Most of these animals have the Ikeda variant of *Theileria*. Work is underway to better understand why there has been an increase in the disease and to develop improved treatment and prevention strategies.

Even though more cases of disease have been seen in NSW, it is important to distinguish this disease from the far more serious diseases caused by other species of *Theileria* not present in Australia, such as east coast fever (caused by *Theileria parva*) that occurs in Africa, and Tropical Theileriosis (caused by *T. annulata*).

The disease occurring in Australia is referred to as Bovine Anaemia caused by *Theileria orientalis* group.

Cause

Disease is caused by protozoan parasites from the *Theileria buffeli/sergenti/orientalis* group. The grouping of 3 species is used because at this stage it is not clear how the protozoa from the

group interact with the various ticks that carry them and their animal hosts. The Ikeda variant seen in a number of countries for simplicity is referred to as *T. orientalis*.

Method of Infection

Generally ticks are the carriers (vectors) responsible for spread of *Theileria* throughout the world. In NSW, the bush tick (*Haemaphysalis longicornis*) is suspected to be responsible though other ticks could be involved. Small numbers (<10 ticks) are able to spread the infection. Many farmers on affected properties have not observed ticks on affected cattle. Experimentally lice and march flies have also been shown to transmit infection. Work is underway to better understand the means of spread in NSW.

Susceptible animals

Disease is seen in calves born in coastal districts and in the eastern foothills of the Great Dividing Range. Disease is generally seen when calves are 8-12 weeks old. By about 6 months of age, immunity develops and it is rare to see disease in calves older than 6 months and adults who have been resident in these districts.

In adults, disease is seen if:

- Cattle are moved from a district where the parasite is not present to districts where *Theileria* is common (typically interstate or inland cattle moved to coastal districts). Disease can be seen in the introduced cattle as soon as 3 weeks though generally 5-8 weeks after introduction.
- Cattle carrying *Theileria* (having red blood cells infected with the parasite) are moved to a property that was previously uninfected. Transmission to home-bred cattle may occur with disease 2-6 months later in home-bred cattle. Typically this has involved movement of coastal cattle to

tableland or slopes districts. In 2010 and 2011, expansion of the parasites to a number of previously clean districts has occurred. The location of where disease has been seen in NSW is available on the Map of *Theileria* cases to December 2010: http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/404459/Map-Theileria-cases-to-2010.pdf

Signs of disease

Signs are those associated with severe anaemia and include: lethargy, lack of appetite, exercise intolerance (weak cattle that lag behind the mob if moved). If forced to run they may stagger and gasp for breath and some may collapse and die. Their gums will be pale and/or yellow. Pregnant cows may abort and still births are common. In dairy cows a drop in milk production will occur. Death rates are highest in heavily pregnant cows.

Confirmation of disease

Diseases such as babesiosis (tick fever) and anaplasmosis cause similar signs. To determine the cause, a veterinarian will need to take blood samples and have these examined in a laboratory to determine if the animal is anaemic and if *Theileria* are present. As the protozoa are tiny, this requires examination of blood under the microscope. Additional tests can be performed to determine which variant(s) are present. Other causes of anaemia also need to be excluded.

Treatment

Current treatment options are limited. Registered products used include oxytetracycline and/or imidocarb. Veterinarians have reported good responses to treatment for mildly affected animals, but poor response is reported for severely affected animals. Blood transfusion has been performed occasionally on valuable animals. Animals improve following transfusion but it is expensive and not practical if multiple animals are involved.

Stress and movement of affected cattle should be minimised or their reduced ability to transport oxygen throughout the body may lead to collapse. If possible avoid handling the affected cattle and put the affected mob in a paddock with good feed and water. If movement or yarding is necessary, move animals slowly.

Managing bovine anaemia caused by *Theileria orientalis* group

There are no vaccines for the disease..

The following precautions are recommended:

- In districts where *Theileria* are commonly found (generally coastal areas) source cattle locally.
- Avoid moving adult cattle especially late pregnant heifers and cows from districts where cattle have a low chance of exposure to districts where *Theileria* are commonly found (generally coastal areas).
- Avoid introducing or mixing cattle from areas where *Theileria* infection is widespread (generally coastal districts) with cattle in districts where *Theileria* infection is uncommon.
- Assess the risk the animal movement poses prior to moving the cattle. In districts where *Theileria* infection is uncommon, the Ikeda variant of *Theileria* may have been introduced through previous cattle movements,. A laboratory test confirming the cattle to be moved have been exposed to *Theileria* indicates the animals would have a low risk of developing disease on moving to districts with *Theileria*.

If these options are not practical, the following management is recommended:

Inspections in high risk periods

In districts where *Theileria* is commonly found (endemic areas) and most adult cattle are immune, calves should be closely inspected when they are 6-12 weeks old.

Introduced cattle should be examined closely when they have been in the district for 3-8 weeks

In districts where *Theileria* is normally not present, but cattle from *Theileria*-infected areas have been introduced, check home cattle regularly between 2 and 6 months after the introductions.

If signs of disease are noted, seek veterinary advice as treatment when animals are mildly affected has been most successful.

General management

If cattle are in good condition and are on good feed, they will be less susceptible to disease. Careful attention to nutrition, worm control and trace element supplementation (if required) will minimise susceptibility to disease.

If possible, avoid mustering or otherwise stressing stock at times when there is a high risk of disease.

At this stage it is not known if infection can be transferred from animal to animal by management procedures such as multiuse needles, castration knives, etc. If practicable, items such as castration knives should be cleaned and then disinfected

between animals. Where not possible such as vaccinating a mob of cattle, use sharp needles and change regularly to minimise blood transfer.

Vector control

Reducing tick numbers should reduce the likelihood of cattle becoming infected. The Bush tick is suspected as the main vector and its control is described in:

http://www.dpi.nsw.gov.au/__data/assets/pdf_file/0/004/50377/three_ticks_of_concern_to_nsw_stockowners_-_primefact_84-final.pdf.

However on some properties the disease has spread where no bush ticks have been seen on cattle, and the actual mode of spread on all properties has not been determined. It is suspected that other vectors could be involved.

Despite having followed the above measures, some producers have experienced significant losses, and the reasons why some herds are more severely affected than others is not clearly understood. It appears in most cases once cattle are exposed, they develop immunity to *Theileria*. Thus calves after about 6 months of age and adults surviving in mobs with sick cattle will not suffer further disease. New introductions (next years calves or introduced naïve adults) will be susceptible. In a small number of farms, new cases appear to continue.

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