Trypanosomes in Australian wildlife

Fact sheet

Introductory statement

Trypanosomes infect a wide range of vertebrates with varying degrees of pathogenicity. Species such as *Trypanosoma vivax* and *T. evansi* are the causative agents for diseases (Nagana and Surra) which have devastating effects on domestic livestock within Africa, Asia and tropical America. The species and significance of trypanosomes that infect Australian wildlife is currently unknown. The mode of transmission and pathogenicity is the topic of current research.

Aetiology

Trypanosomiasis is caused by the haemoflagellate *Trypanosoma* spp. Family (*Trypanosomatidae*), genus (*Trypanosoma*).

Natural hosts

*Trypanosoma* species are known to infect a wide variety of vertebrate hosts including mammals, birds, amphibians and reptiles.

World distribution

Occurs throughout the world.

Occurrences in Australia

Widespread throughout Australia. Within Australian native wildlife, trypanosomes have been reported from the woylie (*Bettongia penicillata*), quoll (*Dasyurus geoffroii*), eastern grey kangaroo (*Macropus giganteus*), common wombat (*Vombatus ursinus*), platypus (*Ornithorhynchus anatinus*), short necked turtle (*Emydura signata*), quokka (*Setonix brachyurus*), swamp wallaby (*Wallabia bicolor*) and Gilbert’s potoroo (*Potorous gilbertii*) as well as wide range of birds, reptiles and fish. The majority of *Trypanosoma* species observed are as yet undescribed, however *T. binneyi* and *T. chelodina* have been confirmed from the platypus and short necked turtle.
**Epidemiology**

Trypanosomes have an indirect lifecycle with an arthropod acting as a vector. Transmission of the parasite can occur in two ways depending on the species. Species such as *T. cruzi* (causative agent of Chaga’s disease in South America) use triatoma bugs as vectors which deposit the parasite in their faeces during feeding which then infect the wound. Alternatively, species such as *T. brucei gambiense* (causative agent of African sleeping sickness) use the tsetse fly as a vector and are injected into the host during a blood meal.

The species of trypanosome infecting Australian wildlife appear to be novel with unknown pathogenicity. Trypanosomes have been implicated in the decline of the woylie in Western Australia and also the extinction of the Christmas Island rat (*Rattus macleari*) (Smith et al. 2008; Wyatt et al. 2008). The vector(s) are currently unknown, although some suspect leeches (Noyes et al. 1999, Hamilton et al. 2005) or tabanid flies (Jakes et al. 2001).

**Clinical signs**

The clinical effects of Australian trypanosomes on native wildlife are currently unknown. It is thought however, that any effects are most likely to be subclinical and may arise as a result of concomitant infections and/or stress of the host (Smith et al. 2008).

**Diagnosis**

Examination of fresh or Giemsa stained blood smears under light microscopy. *Trypanosoma* spp. can be detected among the red blood cells (Figure 1).

![Figure 1. Giemsa stained trypomastigote of a trypanosome species observed in a blood smear from a woylie (*Bettongia penicillata*) [Courtesy Craig Thompson].](image)

**Pathology**

Pathology of infection within Australian wildlife is yet to be determined.

**Differential diagnoses**

The effect of infection with trypanosomes on Australian native wildlife is unknown. For this reason, clinically abnormal cases where trypanosomes are identified should also receive a full work-up to identify any other possible causes of illness or mortality.
**Laboratory diagnostic specimens**

Whole blood smears air dried and stained for microscopy analysis.

Whole blood stored in EDTA tubes or separated from sera and stored at -20 °C can be used for later molecular characterisation.

**Treatment**

No known treatments are available for infection of Australian trypanosomes.

**Prevention and control**

Prevention and control is dependent on breaking the cycle of transmission. Knowledge of competent vectors is required to do this effectively. The vector(s) for the Australian *Trypanosoma* spp. affecting Australian native wildlife are currently unknown.

**Surveillance and management**

There is no coordinated national program for surveillance of trypanosomes in Australian native wildlife. However, the findings of trypanosomes in samples from wildlife in Australia would be considered interesting and unusual and would therefore be logged in the national wildlife health information system as part of national general wildlife surveillance activities.

Australia is at risk of the introduction of pathogenic species of trypanosomes such as *T. evansi* (the causative agent for Surra) from south east Asia. This species has the potential to decimate unique native wildlife and livestock industries (Reid, 2002). The vector for *T. evansi* is a biting fly, species of which occur within Australia. Surra is the subject of another WHA fact sheet.

**Statistics**

Wildlife disease surveillance in Australia is coordinated by Wildlife Health Australia. The National Wildlife Health Information System (eWHIS) captures information from a variety of sources including Australian government agencies, zoo and wildlife parks, wildlife carers, universities and members of the public. Coordinators in each of Australia’s States and Territories report monthly on significant wildlife cases identified in their jurisdictions. NOTE: access to information contained within the National Wildlife Health Information System dataset is by application. Please contact admin@wildlifehealthaustralia.com.au.

There are currently no cases of trypanosomiasis listed in the National Wildlife Health Information System.

**Research**

Current studies are focussing on identification of possible vectors for *Trypanosoma* spp. infecting Australian wildlife and investigation of the role this parasite may have in the decline of the woylie (*Bettongia penicillata*) in Western Australia.

**Human health implications**

Trypanosomes within Australia are not thought to be zoonotic.
## Conclusions

Little is known about the mode of transmission and species diversity of trypanosomes infecting Australian wildlife (Averis et al. 2009). Continued research is required to ascertain the pathogenicity of these species to Australia’s native fauna, and any implications for other species of wildlife and livestock.

## References and other information


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## To provide feedback on this fact sheet

We are interested in hearing from anyone with information on this condition in Australia, including laboratory reports, historical datasets or survey results that could be added to the National Wildlife Health Information System. If you can help, please contact us at admin@wildlifehealthaustralia.com.au.

Wildlife Health Australia would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to admin@wildlifehealthaustralia.com.au. We would also like to hear from you if you have a particular area of expertise and would like to produce a fact sheet (or sheets) for the network (or update current sheets). A small amount of funding is available to facilitate this.
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