Progress Report

While much is known of the impact of trypanosomes on human and livestock health, trypanosomes in wildlife, although ubiquitous, have largely been considered to be non-pathogenic. This project aimed to investigate the genetic diversity and potential pathogenicity of trypanosomes naturally infecting Western Australian marsupials with particular emphasis on those parasites associated with the endangered woylie (*Bettongia penicillata*). 554 blood samples and 250 tissue samples collected from 50 carcasses of sick-euthanised and road-killed animals, belonging to 10 species of marsupials, were screened for the presence of trypanosomes using a PCR of the 18S rDNA gene. PCR results revealed a rate of infection of 67% in blood and 60% in tissues. Inferred phylogenetic trees using 18S rDNA and glycosomal glyceraldehyde phosphate dehydrogenase (gGAPDH) sequences showed the presence of three different species of *Trypanosoma*: *Trypanosoma copemani*, *Trypanosoma vegrandis*, and *Trypanosoma* sp. H25. *Trypanosoma* infections were compared in a declining and in a stable population of the woylie. High rates of infection with *Trypanosoma copemani* (96%) were found in the declining population, whereas in the stable population, *Trypanosoma vegrandis* was predominant (89%). Mixed infections were common in woylies from the declining but not from the stable population. Histopathological findings associated with either mixed or single infections involving *Trypanosoma copemani* showed pathological changes similar to those seen in *Didelphis marsupialis* infected with the pathogenic *Trypanosoma cruzi* in South America: myocarditis and tongue degeneration. *T. copemani* was successfully grown in culture and for the first time it was demonstrated that this species has the capacity to not only colonise different tissues in the host but also to invade cells in vitro. This study also showed that commercial drugs and new compounds developed against the pathogenic *T. cruzi* are active in vitro against *T. copemani*. These results provide evidence for the potential role of trypanosomes in the decline of the woylie and contribute valuable information towards directing management decisions for endangered species where these parasites are known to be present at high prevalence levels.

This research has been presented at international and national conferences. One paper was published in the *International Journal for Parasitology: Parasites and Wildlife*, and three more papers are in process of submission.