

Abstract

Trypanosomiasis is one of the major factors that hinder development of rural economies in Africa. The disease is endemic in some of the most potentially productive lands of tropical Africa where it severely constrains livestock production and human settlement. The lake Victoria shores in Kenya and Uganda have been endemic foci for human sleeping sickness since the early 1900's *Glossina fuscipes* has been responsible for these epidemics. Reptiles especially the monitor lizard are preferred food sources for *G. fuscipes*. Studies were carried out to determine the role played by the monitor lizard, *Varanus niloticus* in the natural transmission cycle of trypanosomiasis between tsetse flies, livestock and man. The objective was to determine the natural occurrence of trypanosomes in lizards. This survey was further supplemented by experimental infections of lizards with *Trypanosoma brucei* and *Trypanosoma congolense*. A combination of diagnostic techniques was used to determine the natural occurrence of trypanosomes in monitor lizards at Busia (Kenya) and Rusinga Island (n=27) was infected while 5.3% (n=19) of the lizards caught from Busia, were infected with trypanosomes. The Trypanosomes parasite isolated from Busia were infected with *Trypanosoma brucei* using the polymerase chain reaction (PCR) and the identity was confirmed by hybridisation using a Trypanozoon specific probe. This is the first record of isolation of *T. brucei* from any reptile. The *T. brucei* parasite was infective to laboratory rats and to tsetse. Experiments were carried out to infect lizards with Trypanozoon and *Nannomonas* trypanosomes by cyclical passage using tsetse. It was possible to infect monitor lizards with *T. brucei* parasites without showing any clinical symptoms of the disease. However, infection of monitor lizards with savannah and riverine *T. congolense* was unsuccessful. The *T. brucei* parasite was infective to *G.m. centralis* (19.4percent) and to laboratory rodents. These results indicate that the monitor lizard facilitates the developmental cycle of *T. Brucei* and forms an important link in the transmission cycle of the parasite between the tsetse vector and mammals. Comparative studies were further carried out to determine the influence of monitor lizard, crocodile and goat blood on infections with *T. brucei* and *T. congolense* in six *Glossina* species. Goat blood supported high infections (52-78.4%) whereas monitor lizard and crocodile blood had depressive effects (18.4-39.9%) on infections in all tsetse. The *morsitans* group of tsetse (*G. m. morsitans*) was more susceptible to infections with *T. brucei* and *T. congolense* than the *palpalis* tsetse (*G. fuscipes*, *G.p. gambiensis* and *G. tachinoides*). *Palpalis* flies maintained totally on monitor lizard blood in the laboratory had low maturation rates (4.6-12.4%) of *T. brucei* organisms. On the other hand, flies maintained on interrupted feeds of goat and lizard, had higher maturation rates of *T. brucei* (8.4-16.3%). This could represent the natural situation where lizards harbour parasites that never reach maturation sites in flies utilising lizards solely as a food source. In the event of an occasional tsetse feed on a favorable host, e.g. goat, parasites acquired from lizards mature and can be transmitted to other hosts marking the beginning of an epidemic. Results of this study indicate that monitor lizards (*Varanus niloticus*) act as reservoirs of *T. brucei* parasites as evidenced by the isolation of *T. brucei* from 5.3% of wild monitor lizards caught from Busia area. This was further verified by infectivity experiments, which demonstrated that lizard blood is not toxic to *T. brucei*. In undisturbed areas, monitor lizards act as natural cryptic (hidden) reservoirs of trypanosomiasis. Along the shores of Lake

Victoria, man has encroached on the natural habitat of monitor lizards and *G. fuscipes*. A close contact therefore exists between man, livestock, monitor lizards and *G. fuscipes* near water along the lakeshores. Results of this study suggest that monitor lizards are an important link in the fly-livestock-man cycle of *T. brucei* parasites. These findings are important in the control of trypanosomiasis. In the past, control efforts have not considered reptiles as important hosts in the disease cycle and yet these animals are prevalent in trypanosomiasis endemic foci. Trypanosome parasite circulation between *G. fuscipes* and monitor lizards serves as natural cryptic pools of infective trypanosomes. These could be important in the sporadic resurgence of trypanosomes after periods of quiescence at the Lake Victoria shores. This in part explains the inability to eradicate the disease from many endemic foci across tropical Africa.