

**INTERACTIONS BETWEEN ENTOMOPATHOGENIC FUNGUS
METARHIZIUM ANISOPLIAE, TRYPANOSOMA CONGOLENSE AND
TSETSE FLY GLOSSINA FUSCIPES FUSCIPES**

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ABSTRACT

Tsetse fly-borne trypanosomiasis remains a significant problem in Africa despite years of interventions and research. The need for new strategies to control and possibly eliminate trypanosomiasis cannot be over-emphasized. Entomopathogenic fungi infect specific arthropod hosts through the cuticle and penetrate deep into the internal tissues causing death in about 3-14 days depending on the initial infectious dose. In addition, they can reduce blood feeding abilities in haematophagous arthropods such as mosquitoes, tsetse and ticks, which may subsequently impact on the development and transmission of parasites borne by these vectors. We investigated the effects of infecting *Glossina fuscipes fuscipes* tsetse flies with wild type and recombinant *Metarhizium anisopliae* fungi on their ability to harbor and transmit *Trypanosoma congolense*. Teneral flies were exposed to *T. congolense*-infected blood for 2 hrs and thereafter exposed for 48 hrs to fungal infection. Insects were then dissected at 2, 3, 5 and 7 days after fungal infection for the presence of the parasite. In the control, parasite titer decreased from 8.7×10^7 *T. congolense* ml⁻¹ at day 2 to 8.3×10^4 *T. congolense* ml⁻¹ at day 7 post-infection. On the other hand, parasite decreased from 8.7×10^7 at day 2 to between 8.3×10^4 and 1.3×10^5 *T. congolense* ml⁻¹ at day 3 post-infection in both fungus-treated groups. No parasite was detected in fungus treatments after 3 days. Flies exposed to both fungal treatments 12 days after feeding on trypanosome-infected blood were unable to transmit *T. congolense* as compared to control flies that successfully transmitted the parasite after 18 days. Up to 90% of flies were able to acquire *Trypanosome* parasite in the control treatments as compared to only 50% in the fungus treatments. There was a drop in total hemocyte count in both groups of fungus-treated flies as compared to the controls but with significant variation in individual hemocyte types. This is the first report demonstrating that fungal infection by *M. anisopliae* reduces trypanosome development in *G. f. fuscipes* and its ability to acquire or transmit *T. congolense*.

Key words: Trypanosomiasis, Tsetse fly, fungus, *G. f. fuscipes*, *T. congolense*, *M. anisopliae*