

Post-feeding midgut trypsin levels and abilities of midgut homogenates to transform parasites were compared in *Glossina morsitans morsitans*, *G. longipennis* and *G. fuscipes fuscipes*. Peak midgut enzyme levels in the different species occurred between 48 and 72 h post-feeding. *Glossina m. morsitans* had the lowest peak in enzyme activity whereas *G. f. fuscipes* the highest. These differences were highly significant ($P < 0.05$, $F = 0.02$, $n = 28$). Midgut enzyme levels in the three *Glossina* species were, however, similar up to 24 h post-feeding ($P > 0.05$).

The abilities of midgut homogenates of *G. m. morsitans*, *G. longipennis* and *G. f. fuscipes* to agglutinate *Trypanosoma brucei brucei*, were investigated. *Glossina f. fuscipes* and *G. longipennis* midguts had twice as much lectin as *G. m. morsitans*, based on their ability to agglutinate *T. brucei*. However, there was no significant difference in the levels of enzyme inhibition in the midguts of these *Glossina* species by *T. b. brucei* and *T. congolense*. Rates of infection with *T. b. brucei* and *T. congolense* in the different *Glossina* species were studied. Mature *T. b. brucei* infection rates in *G. longipennis* were less ($P < 0.05$, $F = 0.38$, $n = 12$) than those infection rates were higher in *G. m. morsitans* ($P < 0.05$, $F = 0.28$, $n = 16$) than those in *G. longipennis* and *G. f. fuscipes*. There were no significant differences between the species with regards to midgut infections with either *T. b. brucei* or *T. congolense*.

The effect of age of flies on their susceptibility to trypanosome infection was studied in *G. m. morsitans*, *G. longipennis* and *G. f. fuscipes*. There were no differences between the teneral and non-teneral flies in the ability of their midguts to transform *T. b. brucei* and *T. congolense* ($P > 0.05$). However, the midguts of non-teneral flies showed greater lysis of *T. b. brucei* than their respective tenerals. *Glossina f. fuscipes* midgut contents had the greatest lytic effects on *T. congolense* among the non-teneral flies. In addition, there were no significant differences with respect to rates of infection in either teneral or non-teneral flies. The midgut trypsin profiles in teneral and non-teneral starved (120 h) flies did not differ within species. Two different *G. pallidipes* populations were assessed for midgut trypsin levels and their ability to transform parasites. There were no statistical differences, in enzyme profiles and trypanosome transformation rates, between Lambwe Valley and Nguruman populations of *G. pallidipes*.

My study has shown that higher post-bloodmeal trypsin and lectin activities exist in the midguts of *G. longipennis* and *G. f. fuscipes* compared to those of *G. m. morsitans*. This gives a concomitantly greater lysis and agglutination titres in the two species, affording them lower susceptibility to trypanosome infection than in *G. m. morsitans*. Similarities in trypanosome transformation and midgut infection rates in the different *Glossina* species may be attributed to similarities in their trypsin and lectin levels during the first 24 hours post-feeding. Any differences in trypanosome infection rates between the Lambwe Valley and Nguruman *G. pallidipes* probably result from other factors, such as sources of bloodmeals.