

# A comparison of the feeding behaviour of tsetse and stable flies

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**Abstract.** In Zimbabwe, observations were made of the behaviour of individual stable flies (*Stomoxys* spp.) (Diptera: Muscidae) and tsetse (*Glossina* spp.) (Diptera: Glossinidae) feeding on cattle during the wet (*Stomoxys* and tsetse) and dry (tsetse only) seasons. For *Stomoxys* landing on adult cattle, only 27% took a full meal (mean feeding time = 147 s). Most *Stomoxys* left the host before completing their meal, largely due to disturbance by the host's defensive behaviour (24%, mean time = 59 s) or other flies (44%, 71 s). The probability of a *Stomoxys* leaving the host progressively increased with time. Simultaneous observations of tsetse showed that, compared to *Stomoxys*, their feeding success was lower (15%), feeding was interrupted earlier (33 s) and the time taken to complete a meal was shorter (109 s). Further studies of tsetse across different seasons and hosts showed that feeding success varied according to host age (adult = 7%; calf = 3%) and was negatively correlated with the frequency of host defensive behaviour and the relative abundance of non-biting Diptera. Disturbances were more often caused by host behaviour (69%) than other flies (31%) and the probability of tsetse leaving decreased with time on the host. Overall, these results suggest that tsetse and *Stomoxys* have different feeding strategies. In particular, tsetse appear to be more responsive to host defensive behaviour, which reduces their feeding success relative to *Stomoxys*. These behavioural differences are consistent with the respective life-history characteristics of *Stomoxys* and tsetse.

**Key words.** *Glossina*, *Stomoxys*, behaviour, competition, density dependence, feeding, stable fly, tsetse, Zimbabwe.

## Introduction

Many species of Diptera feed on vertebrate blood, which provides nutrients necessary for reproduction and development. To the host, a feeding fly results in annoyance and loss of blood at best, and significant disease risk and, ultimately, death at worst. To minimize these risks, hosts have developed mechanisms to prevent or mitigate attack by biting flies, for instance, by employing host defensive behaviour to dislodge the fly, or by herding to reduce the surface area exposed to the attacking insects. For the insect that

requires blood to survive, the act of feeding is therefore associated with significant risk because the behaviour of the host may kill or damage the insect or prevent it from acquiring the blood required for energy, reproduction and development.

The response of a fly to defensive behaviour should depend on the balance between feeding-related risk and the likely benefit of obtaining blood. Anderson & Roitberg (1999) have formalized some of the potential trade-offs between feeding risk and energetic benefit from a persistent feeding behaviour. They suggest that if there is a good chance that blood will be obtained by an insect during subsequent ovarian cycles, and that the insect will live long enough to feed again, then putting current investments at risk through a persistent feeding behaviour would not be expected, especially if there are only modest reproductive

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