

Abstract

Malaria is a severe disease caused by parasites of the *Plasmodium* genus and is transmitted by specific *Anopheles* vector mosquitoes. Different vector control methods are implemented in an effort to reduce malaria transmission. Due to the threat of insecticide resistance in some *Anopheles* vector populations, the sterile insect technique (SIT), amongst other methods, has been seen as an attractive control method to include in integrated malaria vector control programs. The success of SIT relies heavily on the mass rearing of the vector species and its competitiveness in the wild. *Anopheles funestus* is a major malaria vector in Africa and targeting this vector for SIT is essential to reduce the spread of malaria. The aim of this study was to examine the impact of different sugar water concentrations (0 to 40%) on longevity, flight ability and mating of colonised *An. funestus*. The impact of male to female ratio and male age on mating success were evaluated. Furthermore, the potential of one male to inseminate multiple females when adults were fed with different sugar water concentrations was also assessed.

Increased sugar water concentrations had an overall positive impact on male and female *An. funestus* longevity, flight performance and mating success. Results showed that a higher mating success was observed in cages with a higher male to female ratio when compared to the control cage. Increasing the number of males (3:1 male to female ratio) fed with 10% sugar water increased the mating success to the same level as the males (3:1 male to female ratio) fed with the 40% sugar water. The age of the male adults affected mating success for 10% sugar water fed males, however no differences were recorded in mating success for males of different ages fed with 40% sugar water.

In conclusion, results from this study indicate that keeping *An. funestus* adults on a 40% sugar water solution will be advantageous in a mass rearing SIT program.

Keywords: flight performance, longevity, male age, male to female ratio, mating success, SIT, sugar water diet, vector control