

SUMMARY PROJECT “MOSQUITO TRACKING”

Mosquitoes are vectors of infectious diseases that can be fatal such as malaria or dengue. For many mosquito-borne diseases, we have neither a vaccine nor a specific treatment and, therefore, travellers to disease endemic countries are advised to avoid mosquito bites by applying of topical repellents. Topical repellents are biocides and have to be registered while efficacy tests are key for their evaluation. Repellent efficacy is typically assessed under laboratory conditions in the arm-in-cage test in which study participants expose their repellent-treated forearm at regular intervals into a cage containing a large number of host-seeking female mosquitoes until the repellent fails. However, the arm-in-cage test confines the mosquitoes to a very small space and mosquitoes may not behave in the same way they would under a normal use situation. Indeed, previous studies have shown that the arm-in-cage test may considerably underestimate the repellents' efficacy under natural conditions. To gauge the value of the arm-in-cage test and to make evidence-based recommendations for improving efficacy testing, it is essential to understand how mosquitoes perceive and interact with topical repellents in different contexts. Here, we measured the behaviour of host seeking mosquitoes in the arm-in-cage test using a 3D infrared video camera system. We tracked mosquito flight paths of two key disease vectors, *Aedes aegypti* and *Anopheles stephensi*, as they interact with a repellent-treated forearm in the arm-in-cage test. The tested repellents included 20% ethanolic solutions of *N,N*-diethyl-meta-toluamide, *p*-menthane-3,8-diol, icaridin and ethyl butylacetylaminopropionate. We found no clear evidence that volatile chemicals, rather gustatory excito-repellency upon contact with the treated skin, repelled the mosquitoes. Our observations cast doubts on the validity of the arm-in-cage test as the only basis for making label claim recommendations of topical mosquito repellents.