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Potential use of mechanical methods for sex separation of dengue vector mosquitoes for large scale laboratory rearing

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Dengue fever is a rapidly emerging arthropod-borne viral disease that has threatened approximately one-third of the world's population. Due to the absence of an effective drug or vaccine for dengue, prime focus of health sectors lies on the biological control of vector densities via innovative approaches such as Sterile Insect Techniques and Incompatible Insect Techniques etc. This requires mass rearing and releasing of vectors in to the environment. As female mosquitoes are capable of transmitting the disease, elimination of females from mass releasing remains is critical. Furthermore, such eliminations promote the mating of released males with wild females, increasing the efficiency of the techniques. Among numerous mosquito sex separation methods, mechanical sex separation methods are often practiced due to their high effectiveness. The current study investigated the efficiency of a mechanical sex separation method namely; Fay and Morlan glass plate separation. Batches of 500 *Ae. aegypti* larvae were reared under normal and enhanced colony conditions. The emerged pupae from each colony were screened by devising the Fay and Morlan glass plate separator. The separated sets of pupae from each colony were placed in separate cages and reared up to adults for morphological identification. 98.69% (n=227) of the males were separated in the first band along with 15.93% (n=43) of females. The second band included the rest of the males (1.30%, n=3) and females (84.07%, n=227). Meanwhile out of 500 *Ae. aegypti* pupae reared under enhanced rearing conditions, 100% (n=240) of the males were separated as the first band along with 1.15% (n=3) of females. Second band included the rest 98.85% (n=257) of the females. According to the Paired Chi-Square statistics, the percentage of males and females separated at each band differed significantly ($p < 0.05$) at 95% level of confidence. In this method, these separations resulted in a mortality of 4% and 5%, respectively. In conclusion, Fay & Morlan glass plate separator was able to yield a 100% separation of males with only 1.15% females under enhanced culture conditions, exhibiting its potential to be used as a separation method of *Ae. Aegypti* mosquitoes with colony enhancements.

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