# Fitness Evaluation of Two Component Release of Insects Carrying Dominant Lethality (RIDL) Based Transgenic *Aedes aegypti* Mosquito Lines

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Transgenic *Aedes aegypti* mosquito lines are developed for effective dengue control. A two-component RIDL system, with driver and effector transgenes, was previously engineered into the mosquito genome to create two separate transgenic lines. To ensure minimal fitness costs from transgenesis, this study assessed the fitness by measuring adult longevity, fecundity, egg hatch rate, and wing length. Analyses of mosquito survivorship utilized the log-rank test (Mantel-Cox) while fecundity and egg hatch rate between transgenic (TM) and wild-type mosquito (WM) were evaluated using unpaired t-test. Wing length was compared using the Mann–Whitney U test. The survival curve of adult females and males of driver TM were significantly different than those of WM ($p< 0.05$) whereas effector TM had no significant difference when compared to WM ($p>0.05$). Fecundity between TM (72.83 ± 6.8 for driver, 79.49 ± 1.7 for effector) and WM (78.07±3.6) showed no significant differences for both lines ($p>0.05$). However, the egg hatch rate was significantly reduced for driver TM (72.51%± 5.2) when compared to WM (90.44%± 3.7) ($p<0.05$) while no significant difference observed in effector TM (86.9%± 5.1) ($p>0.05$). Further, there was no significant difference between the effector or driver TM when compared to WM of wing length ($p>0.05$). The different survivorship and reduced egg hatch rate in driver TM could probably be attributed to the position effect during the integration or transgene expression causing minor fitness cost. In contrast, the absence of significant difference between effector TM and WM indicates that transgenesis does not impact the fitness of effector TM.

***Keywords***: *Ae Aegypti, Mosquito, Driver, Effector*

***Acknowledgements***: Accelerating Higher Education Expansion and Development Operation Grant 6026-LK/8743-LK and International Atomic Energy Agency Grant SRL 50/47