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**Insights into the effects of interspecific larval competition on *Aedes aegypti* (L.) and *Aedes albopictus* (Skuse) mosquitoes and dengue transmission**

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In Sri Lanka, both *Aedes aegypti* and *Aedes albopictus* mosquitoes are prevalent and contribute to the transmission of dengue, a significant public health concern with high morbidity and mortality rates. *Ae. aegypti* predominates in urban environments and is a primary driver of dengue outbreaks, whereas *Ae. albopictus*, adaptable and found in both urban and rural areas, poses a persistent threat. While the effects on their life history and morphometrics when reared in isolation have been well investigated, the effects of their coexistence, which more closely reflect real-life scenarios in many parts of Sri Lanka, have not been thoroughly explored. Thus, this study addresses this gap by investigating the effects of interspecific larval competition on key biological parameters of both *Ae. aegypti* and *Ae. albopictus*, specifically focusing on larval duration, survival rates, and body size, particularly wing length. The study was conducted in the School of Entomology at the Medical Research Institute (MRI) in Colombo 08, Sri Lanka. The experimental design involved controlled laboratory settings where *Ae. aegypti* and *Ae. albopictus* larvae were reared either in isolation or in mixed-species groups. Eggs of both species, obtained from laboratory cultures, were hatched using the vacuum method to synchronize hatching times. Larvae were reared in 100 mL transparent plastic containers, with fifty larvae of each species reared separately and twenty-five larvae of each species reared together in mixed-species containers, each filled with 50 mL of distilled water. Larvae were fed with finely ground commercial fish food (Apex©), and feeding amounts were increased daily according to larval instar needs. Wing length was determined by mounting the separated wings on slides and measuring the radius vein length using a scale-mounted light microscope. Statistical analyses, including two-sample t-tests, were conducted using MINITAB 14 (Minitab Inc., 2004) to assess the effects of interspecific competition. Results indicate that both *Ae. aegypti* and *Ae. albopictus* exhibited longer larval durations when reared in mixed-species conditions. Survival rates were not statistically significant for *Ae. aegypti* ( $p > 0.05$ ) but increased in mixed-species environments, whereas survival of *Ae. albopictus* was significantly reduced in mixed-species conditions ( $p < 0.05$ ). Morphometric analyses revealed significant differences in wing length between males and females of both species ( $p < 0.05$ ). In males, wing length differences were not statistically significant ( $p > 0.05$ ), but *Ae. aegypti* tended to have longer wings compared to *Ae. albopictus* in mixed-species environments. However, in females, wing length was significantly higher in *Ae. aegypti* and lower in *Ae. albopictus* ( $p < 0.05$ ) when reared in mixed-species environments. In conclusion, interspecific competition between *Ae. aegypti* and *Ae. albopictus* influences larval development, survival rates, and body size differently for each species. Mixed-species conditions result in prolonged larval stages, altered survival rates, and distinct morphometric changes (i.e. wing length), with *Ae. aegypti* demonstrating characteristics suggestive of relative strength or competitive advantage compared to *Ae. albopictus*. The findings highlight the intricate dynamics of interspecific competition among *Aedes* mosquito species, emphasizing the need to consider these ecological interactions in strategies for controlling mosquito populations and mitigating dengue transmission, leading to more effective disease prevention efforts.

**Keywords:** *Aedes aegypti*, *Aedes albopictus*, Dengue, Interspecific competition, Larval development