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The effect of egg desiccation period on the hatching success, morphometrics of emerged larvae and F1 generation adults of *Aedes aegypti* and *Aedes albopictus* (Diptera: Culicidae)

A. G. Y. G. Kumari^{1*}, R. Dalpadado² and L. D. Amarasinghe¹

¹ Department of Zoology and Environmental Management, Faculty of Science, University of Kelaniya, Dalugama, Sri Lanka

² Regional Director of Health Service Office, Gampaha District, Gampaha, Sri Lanka
yureshaganga13@gmail.com*

Dengue is a seasonal vector-borne disease that is transmitted by female *Aedes aegypti* and *Aedes albopictus* mosquitoes. One of the most significant challenges in controlling these mosquitoes is the ability of *Aedes* eggs to withstand prolonged desiccation. This study aimed to investigate the effect of egg desiccation on the hatchability, larval and adult morphometrics, and duration of adult emergence of *Ae. aegypti* and *Ae. albopictus*. The *Aedes* eggs were collected from the field using oviposition traps and soaked in larval-rearing trays. Hatched larvae were reared with fish feed. They were differentiated into *Ae. aegypti* and *Ae. albopictus* and transferred to separate pupal-rearing containers. The resulting adult mosquitoes were provided with a sugar solution and a cattle blood meal using a membrane feeding system. They were allowed to lay eggs on cloth strips. Initially, the hatchability of fresh eggs was calculated for two species. The head length and total length of the fourth instar larvae and head, thorax, abdomen, total length, wing length, and wing width of adults of both species that emerged from fresh eggs were measured. The days needed for adult emergence from fresh eggs were counted. Subsequently, other egg sheets were air dried and stored within the insectary (at $27\pm 2^\circ\text{C}$ and $75\pm 5\%$ humidity), and monthly measurements of the aforementioned parameters were collected for eggs subjected to desiccation over six months. According to the results, the hatchability of both *Ae. aegypti* and *Ae. albopictus* decreased with increasing egg desiccation periods. The hatchability of *Ae. aegypti* and *Ae. albopictus* eggs was highest ($75.0\pm 0.6\%$ and $58.3\pm 0.3\%$ respectively) when the eggs were fresh, and lowest ($22.0\pm 1.2\%$ and $13.3\pm 0.9\%$ respectively) when they were desiccated for six months. There was a strong negative correlation between hatchability and the desiccation period of both *Ae. aegypti* and *Ae. albopictus* (Pearson's correlation, $p < 0.05$, $R^2 = 0.840$ and $R^2 = 0.957$ respectively). Pearson's correlation also indicated a strong negative correlation between egg desiccation period and head length ($p < 0.05$, $R^2 = 0.875$ for *Ae. aegypti* and $R^2 = 0.846$ for *Ae. albopictus*), as well as total length ($p < 0.05$, $R^2 = 0.812$ for *Ae. aegypti* and $R^2 = 0.888$ for *Ae. albopictus*) of the fourth instar larvae. The adult emergence was delayed with increasing egg desiccation periods, with the longest duration (*Ae. aegypti*; 15.0 ± 0.2 days and *Ae. albopictus*; 26.0 ± 0.2 days) observed when eggs were desiccated for six months. However, no significant differences were found in the morphometrics of adult mosquitoes of both species that emerged from desiccated eggs (one-way ANOVA, $p > 0.05$). In conclusion, the study showed that prolonged egg desiccation reduced hatchability, delayed adult emergence, and negatively affected the morphometrics of fourth instar larvae of *Ae. aegypti* and *Ae. albopictus*. However, the morphometrics of the F1 generation adult mosquitoes were not significantly different from those of fresh eggs, suggesting that the egg desiccation period does not negatively affect the overall morphometrics of adult *Aedes* mosquitoes.

Keywords: *Aedes aegypti*, Egg desiccation, Hatchability, Morphometrics, *Aedes albopictus*

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