

## EFFECT OF PHYSICOCHEMICAL PARAMETERS OF BREEDING WATER ON FITNESS OF DENGUE VECTOR MOSQUITOES

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The quality of mosquito breeding grounds significantly affects mosquitoes' growth and fitness. The present study aimed to determine the association between characteristics of the breeding environment and the fitness of dengue vector mosquitoes. Sampling was conducted in Kandy, Matale, Anuradhapura, Rathnapura, Kegalle, and Gampaha districts. The physicochemical properties of the breeding sites were measured, and larval density was recorded. Each larval sample was separately reared under insectary conditions, and body measurements were taken upon adult emergence. Of 152 potential breeding sites, 88 were positive for the presence of *Aedes* larvae. *Aedes albopictus* was the dominant species (93.2%), as only 6.8% of breeding sites were positive for *Aedes aegypti*. The study revealed that *Aedes* larvae can survive in a wide range of physicochemical parameters. The temperature of breeding sites ranged from 23.0–39.1 °C. The total dissolved solids were in a broader range (1-3000 ppm), while dissolved oxygen levels ranged from 0.38–8.81 ppm. A high density of larvae was reported at a pH ranging from 5.27 to 10.42. Larvae could tolerate low conductivity (10 µS) to extremely high conductivity (6000 µS). Larval density ranged from 1–1885 larvae/L. A one-way ANOVA test confirmed a significant difference in wing lengths of mosquitoes from different breeding habitats (**female**: p=0.001, F=15.98, DF=19, **male**: p=0.001, F=19.82, DF=13). The Principal Component Analysis showed that 87% of the variance among variables is explained by four PCs (PC1-water temperature, total dissolved solids; PC2-dissolved oxygen, pH; PC3-larval density, pH; PC4-pH, water temperature). According to correlation analysis, body size variations in mosquito populations are independent of the physicochemical parameters of the breeding water, suggesting the effect of unknown factors. A wider distribution of *Ae. albopictus* in a broader range of microhabitat conditions suggests the high tolerance and adaptability of this species.

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