

Laboratory Evaluation of the Bio-control Efficacy of Selected Copepods on Dengue Vectors of Sri Lanka

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Among variety of alternatives for management of dengue vectors, biological control remains as a promising approach, due to its high efficacy, sustainability and low impacts on human and ecosystem health. Copepods are considered as a leading predator of mosquito larvae including *Aedes* vectors. However, the predatory potential of different copepods on bio-control of dengue vectors has been less studied in Sri Lanka. Therefore, the current study aimed to evaluate the predatory success of five locally abundant copepods on both *Aedes aegypti* and *Ae. albopictus*. Copepod collections were made from water bodies and rock pools located in the Kandy and Gampaha districts by using a plankton net. After morphological identification, single gravid copepods of different species were used to establish copepod cultures under standard laboratory conditions. Five adult copepods of each species were transferred into containers and groups of 200 first instar *Ae. Aegypti* larvae were introduced in to each container, separately. The number of surviving larvae in each container was recorded at 3 hour intervals up to 24 hours. Five replicates were conducted for each copepod species. Same experimental design was followed for *Ae. albopictus*. General Linear Modelling technique (GLM) followed by Tukey's pair-wise comparison was used to make statistical inferences on the significance of average larval consumption rates by studied copepod species. SPSS (version 23) was used for the statistical analysis. Five species of copepods, namely *Cyclops languides*, *C. varicans*, *C. vernalis*, *Mesocyclopleuckarti* and *M. scrassus* were considered during the study. Average predation rates of 34.9 ± 1.80 and 33.5 ± 1.06 for *Ae. aegypti* and *Ae. albopictus*, respectively, were indicated by *M. leuckartii* as the highest predation rates. Meanwhile, *M. scrassus* showed the second highest predation rates for both *Aedes* vectors. On the other hand, the lowest predatory efficacy was shown by *C. languides* with 10.6 ± 1.60 and 8.4 ± 1.10 for *Ae. aegypti* and *Ae. albopictus*, respectively. The average consumption rates of different copepod species varied significantly ($p < 0.05$ at 5% level of significance). The type of *Aedes* species had a significant influence on the predatory efficacy of studied copepods ($p < 0.05$) under laboratory conditions. In conclusion, *M. leuckartii* and *M. scrassus* that reported the highest predation efficacies on both *Aedes* larvae could be suggested as potential bio-control agents for dengue vector management approaches in Sri Lanka after semi field and field settings.

Keywords: Dengue, *Aedes*, Copepods, Biological Control

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