

ABSTRACT

The present study evaluated the predatory capacity and efficacy of a local strain of copepod *Mesocyclops leuckarti* (*M. leuckarti*) and a bacterial strain, *Bacillus thuringiensis israelensis* (*Bti*) in an integrated control of dengue vector *Aedes aegypti* in water containers. The main objective was to develop a cost-effective and environment friendly integrated vector control model in Lahore, Pakistan. *M. leuckarti* was collected from an artificial pond in the Lahore zoo. Single species culture was established in laboratory. *Aedes aegypti* reared in laboratory were used to evaluate the toxic effect of *Bti* and susceptibility was determined by LC₅₀-LC₉₅ values. Effective dose of *Bti* was assessed based upon laboratory studies for larvae and the copepod growth in the field trials. The predatory capacity of *M. leuckarti* in the laboratory indicated 100% reduction of 1st instar *Aedes aegypti* in 1:1-1:4 ratios (25 copepod : 25, 50, 75 & 100 larvae) in 200ml container post 24 hour exposure. Larval mortality was evaluated singly (*Bti* and *Mesocyclops leuckarti*) and both with *Bti*+copepod (integrated) in the field using 4 litre containers for 10 weeks. *M. leuckarti* and *Bti* showed 100% larval mortality during the first week of field experiments when used singly, which declined to 94 and 64% in the following weeks up to the week 05 respectively. At the end of fifth week *Bti* was not effective to kill larvae and reapplication in the sixth week caused 100% mortality which decreased up to 80 and 91% by the end of week 10 with *Bti* and *Mesocyclops* respectively. In an integrated group (*M. leuckarti*+*Bti*), larval mortality was 100% for the first 4 weeks with a little decline to 99.3% by the end of week 5. Reapplication of *Bti* in this group during sixth week caused 100% mortality which remained 99.6% by the end of week 10. ANOVA indicated highly significant (F=9.6, df=19, P=0.024) increase in mortality of first instar of *Ae. aegypti* in an integrated group as compared to copepod and *Bti* alone in the duration of 10 weeks in the field. Therefore, an integrated control was found to be an effective strategy for the control of dengue vector in Pakistan. The potential capacity as predator of *M. leuckarti* was also evaluated on the wild population of *Ae. aegypti* larvae from the two ponds in Lahore Zoo (duck and swan ponds) for the duration of 10 weeks. Duck pond, without copepod contained a considerable number of *Ae. aegypti* larvae while swan pond with copepods contained a very limited number of larvae.