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Evaluation of the effectiveness of a solid formulation of *Bacillus thuringiensisisraelensis* (Mosquito dunks®) in controlling the population density of vectors of dengue in Sri Lanka

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A slow release, solid formulation of *Bacillus thuringiensis israelensis*-"Mosquito Dunks®" (manufactured in USA) was evaluated for its effectiveness in controlling the population density of vectors of dengue in Sri Lanka. The study was carried out in a selected locality in the Colombo District during August-December 2011. The product was used in the manufacturer recommended dosage (one dunk per 2.3 – 9.3 m^2 of water) in regularly unserviceable vector breeding places especially in the upper layer of premises. Standard larval surveys (100 premises in each area) and ovi-trap surveys (30 premises with duplicate traps per premise in each area) were carried out in a treated and an untreated area to determine vector densities; Breteau Index (BI), Ovi-trap Index (OTI), Egg Density Index (EDI) and Mean Egg Density (MED).

BI in the treated area showed only a progressive drop during the post-treatment period (38.9%, 21.9% and 68.4% at 08th, 28th and 45th day post-treatment respectively) while that in the untreated area showed a high percentage increase (650%, 635% and 585% respectively). Oviposition activity reduced markedly by 28th day post-treatment (53.1% OTI, 67.8% and $p < 0.05$ EDI and 84.9% MED) in the treated area whereas those in the untreated area were increased (400% OTI, 450% and $p < 0.05$ EDI and 462% MED). Oviposition activity in the treated area showed an increase by 45th day post-treatment, still remaining at lower values than those before treatment (16.3%, 20.2% and $p > 0.05$ and 20.5% reductions in OTI, EDI and MED respectively).

All three vector density indices measured during the post-treatment period reduced in the treated area whereas they were increased in the untreated area. A marked reduction in oviposition activity before a substantial reduction in BI in the treated area may be attributed to the treatment of regularly unserviceable breeding places with Mosquito dunks®. Therefore, Mosquito dunks® when used at manufacturer recommended dosage is effective in controlling population densities of vectors of dengue. The residual activity of the product appears to last approximately 30 days. However, it could only be used as a gap filler in a comprehensive vector control programme.

Keywords*: Bacillus thuringiensis israelensis*, breteau index, oviposition activity

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