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Dengue Virus Infection Rate in Mosquitoes Collected in Thailand Related to Environmental Factors

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Abstract : Dengue hemorrhagic fever is the most important Mosquito-borne disease and the major public health problem in Thailand. The most important vector is Aedes aegypti. Environmental factors such as temperature, relative humidity, and biting rate affect dengue virus infection. The most effective measure for prevention is controlling of vector mosquitoes. In addition, surveillance of field-caught mosquitoes is imperative for determining the natural vector and can provide an early warning sign at risk of transmission in an area. In this study, Aedes aegypti mosquitoes were collected in Amphur Muang, Phetchabun Province, Thailand. The mosquitoes were collected in the rainy season and the dry season both indoor and outdoor. During mosquito's collection, the data of environmental factors such as temperature, humidity and breeding sites were observed and recorded. After identified to species, mosquitoes were pooled according to genus/species, and sampling location. Pools consisted of a maximum of 10 Aedes mosquitoes. 70 pools of 675 Aedes aegypti were screened with RT-PCR for flaviviruses. To confirm individual infection for determining True infection rate, individual mosquitoes which gave positive results of flavivirus detection were tested for dengue virus by RT-PCR. The infection rate was 5.93% (4 positive individuals from 675 mosquitoes). The probability to detect dengue virus in mosquitoes at the neighbour's houses was 1.25 times, especially where distances between neighboring houses and patient's houses were less than 50 meters. The relative humidity in dengue-infected villages with dengue-infected mosquitoes was significantly higher than villages that free from dengue-infected mosquitoes. Indoor biting rate of Aedes aegypti was 14.87 times higher than outdoor, and biting times of 09.00-10.00, 10.00-11.00, 11.00-12.00 yielded 1.77, 1.46, 0.68mosquitoes/man-hour, respectively. These findings confirm environmental factors were related to Dengue infection in Thailand. Data obtained from this study will be useful for the prevention and control of the diseases.

Keywords : Aedes aegypti, Dengue virus, environmental factors, one health, PCR
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