The effect of host type on movement patterns of *Aedes aegypti* (Diptera: Culicidae) into and out of experimental huts in Thailand

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ABSTRACT**:** Flight behavior studies were carried out from December 2004 through February 2005 at two sites in Thailand to compare the movement patterns of *Aedes aegypti* into and out of experimental huts baited with a human host, dog host, or without a host using a mark-release-recapture study design. Studies were conducted in isolated villages of Kanchanaburi and Chiang Mai Provinces, Thailand. In the presence of a human host only 4.9% (39/800) of the *Ae. aegypti* females departed the hut as compared to 46.5% (372/800) when a dog was present. There was no significant difference in the numbers of *Ae. aegypti* exiting when comparing dog to no host. A peak in exiting behavior in the absence of any host (human or dog) was observed between 1400-1700 h. Ingress behavior was much stronger when a human host was present in the hut with the peak of entering occurring in the morning (0830-1130 h) compared to 1000-1200 h without a host. Overall, significant differences between the two host types were observed with *Ae. aegypti* females being more attracted to humans *($p< 0.05$)* than dogs. There was no significant difference between numbers of *Ae. aegypti* entering the hut baited with a dog and the hut containing no host source. The experimental hut design used in the present study can serve as a protocol for testing the exiting and entering behavior of *Ae. aegypti* in response to chemical compounds. ***Journal of Vector Ecology*** **31 (2): 311-318. 2006.**

Keyword Index: Aedes aegypti, mosquitoes, exiting/entering movement, host type, Thailand.

INTRODUCTION

Several countries continue to experience endemic and re-emerging dengue fever (DF) and dengue hemorrhagic fever (DHF) (Gubler 1997). In Thailand, outbreaks of DHF were first recognized in Bangkok in 1957 and subsequently the disease has expanded throughout the country (Sheparrd et al. 1969, Chareonsook et al. 1996). In spite of continued vigilance in control measures, dengue cases in Thailand recently increased from 2000 to 2004. The reason for this increase is unclear but is most likely due to a combination of factors including the increase of human and economic activities in the urban and semi-urban zones. In addition, traditional water storage practices increase the availability of breeding sites for *Aedes aegypti*, a primary vector of DF and DHF (Kittayapong and Strickman 1993).

Aedes aegypti, a day biting mosquito, is highly anthropophilic and often resides in and near human dwellings (Christophers 1960, Yasuno and Tonn 1970, Gubler 1997, Thavara et al. 2001). This mosquito has been found to be highly adapted to all man-made and natural environments and is an extremely efficient vector of dengue (Chareonviriyaphap et al. 2003, Vazeille et al. 2003, Rodhain and Rosen 1997). Preventive measures for dengue rely entirely on vector control, the most effective method for reducing disease transmission in urban and semi-urban areas of the world (Reiter and Gubler 1997, Pant et al. 1974, Perich et al. 2001). Chemical control, however, is becoming increasingly difficult due to a number of issues including environmental concerns, international bans, adverse health effects, and insecticide resistance. For these reasons, a renewed effort is underway to identify novel compounds for use against the adult stage of this extremely efficient vector species. Many investigators have utilized experimental huts to study the ingress and egress behaviors of malaria vectors in response to insecticides applied to the interior surfaces of house walls (Kennedy 1947, Roberts and Alecrim 1991, Grieco et al. 2000, Chareonviriyaphap et al. 1997, 2001, Roberts et al. 2000). However, there is no standard protocol for evaluating test compounds using experimental huts with *Ae. aegypti* mosquitoes. This investigation was the first attempt to study the movement patterns of *Ae. aegypti* using a mark-release-recapture design and experimental huts baited with different host types; human, dog, and no host. The objectives of this study were to describe the movement patterns of *Ae. aegypti* into and out of experimental huts in response to different host stimuli and determine the relative attractiveness of huts baited with human hosts, dog hosts, or no hosts to blood-seeking females.