

## Biting patterns of *Anopheles minimus* complex (Diptera: Culicidae) in experimental huts treated with DDT and deltamethrin

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**ABSTRACT:** Biting patterns of natural populations of *Anopheles minimus* s.l. females entering experimental huts treated with DDT and deltamethrin were carried out at Pu Teuy Village, Sai Yok District, Kanchanaburi Province, western Thailand. Two experimental huts, control and treatment, were constructed in the fashion of local Thai homes. Pre-spray biting activity of *An. minimus* females peaked at 19:00-22:00. Post-treatment exposure continued to show greater landing activity during the first half of the evening. An overall greater proportion of *An. minimus* females entered the hut treated with deltamethrin compared to DDT. The hut fitted with DDT-treated net panels showed a 71.5% decline in attempted blood feeding, whereas exposure to deltamethrin-treated panels resulted in a 42.8% human-landing reduction. DDT exhibited significantly more pronounced ( $P < 0.05$ ) effects in overall reduction of biting activity than did deltamethrin. **Journal of Vector Ecology 33 (2): 285-292. 2008.**

**Keyword Index:** *Anopheles minimus*, behavioral responses, excito-repellency, experimental hut, deltamethrin, DDT.

### INTRODUCTION

Malaria is the most serious vector-borne disease in tropical and subtropical regions, with transmission occurring in over 105 countries world-wide. Approximately 70% of malaria cases occur on the African continent, with the remaining 30% in the Americas and Asia. In Thailand, malaria remains a major re-emerging health problem, although vector control programs have been successful in reducing morbidity and mortality. Approximately 70% of the malaria cases are documented from the undeveloped national borders of eastern Myanmar where the efficient malaria vectors are members of the *Anopheles minimus* complex, one of the most important malaria vectors in Thailand. *An. minimus* remains as a significant vector because of its major endophagic and anthropophagic behaviors (Rattanarithikul et al. 1996, Sungvornyothin et al. 2006).

The *An. minimus* complex responds differently to intradomiciliary use of insecticides (Ismail et al. 1975, Harrison 1980, Parajuli et al. 1981). In Thailand, indoor residual spray (IRS) is routinely conducted to interrupt human-vector contact and transmission (Chareonviriyaphap et al. 2001). For years, DDT was the chemical of choice and was used extensively in malaria-endemic areas. Because of anticipated adverse environmental impacts and general negative public perceptions, DDT was removed from malaria control in Thailand in 2000 and replaced by synthetic pyrethroids (Chareonviriyaphap et al. 2000).

Pyrethroids have been widely accepted for controlling disease vectors due to their low mammalian toxicity (Elliot et al. 1987). Deltamethrin, a commonly used synthetic pyrethroid in public health programs, has been the mainstay for IRS use to combat malaria transmission in Thailand (Pothikasikorn et al. 2005).

There have been numerous attempts to accurately measure the behavioral responses of mosquitoes to insecticides (Smith 1965, Roberts et al. 1984, Rutledge et al. 1999, Grieco et al. 2000, Pates and Curtis 2005). Studies using experimental huts provide valuable information on the behavioral responses of natural occurring mosquito populations. Understanding the behavioral responses of different disease vectors to test compounds can facilitate vector control operations by helping select the most effective interventions possible and in targeting the primary disease vectors. However, little has been documented on the house entering behavior of *An. minimus* females in experimental huts treated with either DDT or deltamethrin. For this reason, the effects of chemicals applied to the interior of homes on the behavior of this important vector warrants further study. The experimental huts used in the current study have been used to evaluate the flight behavior of *Aedes aegypti* in Thailand (Suwonkerd et al. 2006). The data presented here are the results of the first comparison of the behavioral responses of *An. minimus* to DDT and deltamethrin, as measured by levels of biting activity both pre- and post-spray.