

## Susceptibility of various mosquitoes of Thailand to nocturnal subperiodic *Wuchereria bancrofti*

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**ABSTRACT:** Ten different mosquito species representing five genera were allowed to feed on human blood containing microfilariae (5.5–6.5 mf/μl) of nocturnal subperiodic *Wuchereria bancrofti* from Kanchanaburi Province, Thailand. *Aedes aegypti*, *Aedes albopictus*, *Aedes desmotes*, *Downsiomyia* species (=Finlaya Niveus Group), *Culex quinquefasciatus*, *Anopheles dirus* A, *An. maculatus*, *An. minimus*, *Armigeres subalbatu*s, and *Mansonia uniformis* were fed under laboratory conditions using an artificial membrane feeding procedure. All species had adequate feeding responses (68–87.3%) and survival (66.4–81.3%) 12–15 days post-feeding. *Anopheles maculatus* was the most susceptible (73.1%) for development of infective third-stage larvae (L3), followed by *An. minimus* (61.0%), *Downsiomyia* species (27.3%), *Ae. desmotes* (24.2%), *An. dirus* A (24.7%), *Cx. quinquefasciatus* (19.2%), *Ma. uniformis* (9.2%), and *Ae. albopictus* (0.01%). *Aedes aegypti* and *Ar. subalbatu*s were found to be completely refractory. *An. maculatus* produced the greatest mean number of L3 per infective mosquito (5.6 L3) and *Ae. albopictus* the least (1 L3). The two *Anopheles* demonstrated significantly greater susceptibility ( $P < 0.05\%$ ) to *W. bancrofti* than the two *Aedes* species regarded as natural vectors. **Journal of Vector Ecology 33 (2): 313–320. 2008.**

**Keyword Index:** Culicidae, mosquitoes, susceptibility, microfilaria, *Wuchereria bancrofti*.

### INTRODUCTION

Lymphatic filariasis is a mosquito-borne disease caused by three species of nematode parasites – *Wuchereria bancrofti* (Cobbold 1877) Seurat, 1921, *Brugia malayi* (Brug 1927) Buckley 1960, and *Brugia timori* (Sasa 1976). Over 90% of reported disease is caused by *W. bancrofti*, an indigenous parasite throughout most of the warm regions of the world (WHO 1992). An estimated 120 million people are infected across more than 80 endemic countries and it is considered a leading cause of permanent and long-term disability (WHO 2000). Common presentations of chronic Bancroftian filariasis resulting from lymphatic obstruction include lymphoedema, elephantiasis, chyluria, and hydrocele (Ottesen et al. 1997). As this parasite displays periodicities throughout its vast geographical range and is considered non-zoonotic with only humans serving as the definitive host (WHO 1992), the disease has been targeted for worldwide elimination by 2020 under the Global Program to Eliminate Lymphatic Filariasis (GPELF) (WHO 1997, Behbehani 1998, Zagaria and Savioli 2002). Efforts concentrate primarily on community-level mass screening for infection and distribution of anti-filarial drugs with diligent case follow-up and surveillance (Ottesen et al. 1997, WHO 2000).

Bancroftian filariasis is endemic in rural, hilly, mostly forested areas of western Thailand along the Thai-Myanmar border, including Ranong, Ratchaburi, Kanchanaburi, Tak,

and Mae Hong Sorn Provinces. The predominate parasite strain in Thailand is nocturnally subperiodic (NSP) (Mak 1987, Suvannadabba 1993), with peak microfilaremia typically seen in the early evening between 18:00 and 20:00 h (Harinasuta et al. 1970, Gould et al. 1982). Several mosquito genera have been implicated as real or potential (experimental) vectors of this parasite: *Downsiomyia harinasutai* Knight, *Ochlerotatus togoi* (Theobald), *Aedes desmotes* (Giles), *Aedes annandalei* (Theobald), *Aedes imitator* (Leicester), *Anopheles stephensi* Liston, and *Mansonia dives* (Schiner) (Harinasuta et al. 1968, 1970, Gould et al. 1982, Service 1993). However, only *Do. harinasutai* (and possibly other members in the *Finlaya* Niveus Group Theobald), *Ae. desmotes*, and *Ma. dives* have been found naturally infected in western Thailand (Gould et al. 1982).

The nocturnal periodic (NP) strain of *W. bancrofti*, present in many tropical urban areas of the world (Sasa 1976) has, until recently, been absent (or extremely uncommon) in Thailand despite the ubiquitous presence of capable vectors like *Culex quinquefasciatus* Say (Sucharit and Harinasuta 1975, Sucharit et al. 1981). Recently, however, this strain has been reported in Thailand in association with Burmese laborers working in Thailand at prevalence rates of 2 to 5% (Jitpakdi et al. 1998, Tritteeraprapap and Songtrus 1999) generating renewed interest in this parasite. Tritteeraprapap et al. (2000) reported that the *Cx. quinquefasciatus* found in these areas are permissive for the development of NP *W. bancrofti* to the third-stage infective larvae (L3) following