

# Seasonal Abundance and Blood Feeding Activity of *Anopheles minimus* Theobald (Diptera: Culicidae) in Thailand

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**ABSTRACT** Anopheline mosquito larvae and adults were sampled at Ban Pu Teuy, Tri-Yok District, Kanchanaburi Province, western Thailand, from January 2000 to December 2001. Over the period of 2 yr, *Anopheles minimus* sensu lato was the most commonly collected species, followed by *Anopheles swadiwongporni* and *Anopheles dirus* sensu lato; all three species are important vectors of malaria in Thailand. Attempted blood feeding by *An. minimus* occurred throughout the night, with two distinct feeding peaks: strong activity immediately after sunset (1800–2100 hours), followed by a second, less pronounced, rise before sunrise (0300–0600 hours). *Anopheles minimus* were more abundant during the wet season compared with the dry and hot seasons, although nocturnal adult feeding patterns were similar. *Anopheles minimus* fed readily on humans inside and outside of houses, showing a slight preference for exophagy. The human-biting peak of *An. minimus* in our study area differed from other localities sampled in Thailand, indicating the possible existence of site-specific populations of *An. minimus* exhibiting different host-seeking behavior. These results underscore the importance of conducting site-specific studies to accurately determine vector larval habitats and adult activity patterns and linking their importance in malaria transmission in a given area.

**KEY WORDS** *Anopheles minimus*, blood feeding, mosquito abundance, exophagy, Thailand

IN THAILAND, MALARIA is still one of the important infectious diseases, with more than 100,000 reported cases each year (Department of Communicable Disease Control 1985–2001). Surveillance data has indicated malaria continues to occur sporadically over much of the country and has reemerged in previously malaria-free localities (Department of Communicable Disease Control 1985–2001). Malaria remains prevalent along the underdeveloped national borders between Thailand and eastern Myanmar and western Cambodia (Chareonviriyaphap et al. 2000). Nearly one half of all reported malaria cases in the country have been from the mountainous western frontier and international borderlines with Myanmar extending from Tak to Kanchanaburi Provinces. These areas are especially vulnerable, because of uncontrolled tribal population movements associated with occupational activities, including gem mining, hunting, and logging. *Anopheles minimus*, a confirmed and important malaria vector in Thailand, is abundant in the border frontier area (Chareonviriyaphap et al. 2000).

The taxon *An. minimus* Theobald represents a complex of closely related species that are difficult to distinguish morphologically (Rattanaarithikul and Punthusiri 1994). Members of this species complex are common along the Thai-Myanmar border, particularly in Kanchanaburi Province (Green et al. 1990). In Thailand, at least three related species are present (Sucharit et al. 1988, Baimai 1989, Green et al. 1990): species A is found throughout the country; whereas species C and D are more commonly collected along the western Thai-Myanmar border, including Kanchanaburi Province (Baimai 1989). This complex has been reported to be primarily zoophilic in feeding habits, preferring to feed and rest out of doors, especially in response to indoor residual spraying (IRS) of insecticides (Nutsathapana et al. 1986). Behavioral avoidance of structures by the *An. minimus* group in response to IRS also has been reported from Vietnam (Van Bortel et al. 1999). During the past two decades, disease vector research in Thailand had been reorganized and gained useful information on the public health importance of vectors. As a consequence, the number of *Anopheles* species and species complexes reported has increased (Baimai 1989). In recent years, infrastructural development, expanded housing, and facility-based tourism in forest and forest-fringe areas has resulted in the adaptation of many malaria vectors to these ecological changes. Information on the life history, blood feeding activity, and ecological relationships for pathogens transmission by *An. minimus*

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