

Biting patterns and host preference of *Anopheles epiroticus* in Chang Island, Trat Province, eastern Thailand

Wanapa Ritthison^{1,2}, Krajana Tainchum¹, Sylvie Manguin³, Michael J. Bangs^{1,4},
and Theeraphap Chareonviriyaphap¹✉

¹Department of Entomology, Faculty of Agriculture, Kasetsart University, Bangkok 10900, Thailand, faasthc@ku.ac.th

²Center for Advanced Studies for Agriculture and Food, Kasetsart University Institute for Advanced Studies, Kasetsart University, Bangkok 10900, Thailand

³Institut de Recherche pour le Développement (IRD), Lab. Immuno-Physiopathologie Moléculaire Comparée, UMR-MD3, 34093 Montpellier, France

⁴Public Health & Malaria Control, International SOS, Jl. Kertajasa, Kuala Kencana, Papua 99920, Indonesia

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ABSTRACT: A study of species diversity of *Anopheles* mosquitoes, biting patterns, and seasonal abundance of important mosquito vectors was conducted in two villages of Chang Island, Trat Province, in eastern Thailand, one located along the coast and the other in the low hills of the central interior of the island. Of 5,399 captured female anophelines, 70.25% belong to the subgenus *Cellia* and remaining specimens to the subgenus *Anopheles*. Five important putative malaria vectors were molecularly identified, including *Anopheles epiroticus*, *Anopheles dirus*, *Anopheles sawadwongporni*, *Anopheles maculatus*, and *Anopheles minimus*. *Anopheles epiroticus* was the most commonly collected species in the coastal site, whereas *An. dirus* was found to be most abundant in the forest-hill site. From both locations, a greater number of mosquitoes was collected during the dry season compared to the wet. *Anopheles epiroticus* showed greater exophagic and zoophilic behavior with the highest blood feeding densities occurring between 18:00 and 19:00. In contrast, *An. dirus* demonstrated an activity peak between midnight and 01:00. We conclude that *An. epiroticus* and *An. dirus*, in coastal and inland areas, respectively, appear to be the most epidemiologically important malaria vectors on Chang Island. As no studies of vector competency specific to Chang Island have been conducted, our conclusions that these two species play a primary role in malaria transmission are based on evidence from other localities in Thailand and mainland Southeast Asia. This information serves as a basis for designing improved vector control programs that target specific species, and if integrated with other interventions could result in the elimination of malaria transmission on the island. *Journal of Vector Ecology* 39 (2): 361-371. 2014.

Keyword Index: *Anopheles*, species diversity, malaria, Chang Island, Thailand.

INTRODUCTION

In Thailand, malaria is a significant cause of morbidity and remains prevalent and entrenched in the more remote forested and hilly areas, especially along the international borders with Cambodia and Myanmar where efficient malaria vectors are common and access to health care distant (Kongmee et al. 2012). Of the approximately 73 *Anopheles* species recognized in Thailand, member species in the Leucosphyrus Group, Maculatus Group and Minimus Subgroup, include five of the primary malaria vectors (Rattarithikul et al. 2006). Nine species of mosquitoes have been incriminated as malaria vectors in Thailand (Green et al. 1991, Rattarithikul et al. 2006, Suwonkerd et al. 2013), including *Anopheles dirus* (Baimai et al. 1988, Rosenburg et al. 1990), *An. baimaii* (Baimai et al. 1988, Green et al. 1991), *An. minimus* (Ratanatham et al. 1988, Rattarithikul et al. 1996), *An. pseudowillmori*, *An. maculatus* (Cheong et al. 1968), *An. aconitus* (Maheswary et al. 1992), *An. sawadwongporni*, and *An. campestris* (Somboon et al. 1998, Coleman et al. 2002), all of which are associated with hilly forest environments and forest-fringe areas. The last malaria vector, *An. epiroticus*, occurs along mainland coastal areas and islands where

this species predominantly utilizes brackish water habitats (Sumruayphol et al. 2010).

Anopheles sundaicus s.l. is regarded as the principal vector of malaria along many coastal areas in Southeast Asia (Adak et al. 2005, Alam et al. 2006, Dufour et al. 2007a). The species complex is widely distributed from northeastern India, eastwards to southern Vietnam (south of the 11th parallel), and southwards to the Andaman and Nicobar Islands (India), Malaysia (peninsular and northern Borneo), and Indonesia (Java, Sumatra, Sulawesi, and Lesser Sunda islands) (Linton et al. 2001, Dufour et al. 2004a). At least four sibling species are recognized in the complex, *An. epiroticus* (formerly *An. sundaicus* species A), *An. sundaicus* s.s., *An. sundaicus* species E, and *An. sundaicus* species D (Dufour et al. 2007b, Alam et al. 2006). In Thailand, only *An. epiroticus* is regarded as present and is found along the coastal regions and islands of the eastern and southern regions (Scanlon et al. 1968, Sukowati et al. 1996, 1999, Linton et al. 2005, Rattarithikul et al. 2006) and has been incriminated as a secondary malaria vector (Gould et al. 1966, Harinasuta et al. 1974, Chohanadisai et al. 1989).

Chang Island is located in the Gulf of Thailand, (Ko Chang District, Trat Province), eastern Thailand, 30 km east