

INTRODUCTION

This publication is the result of studies undertaken in Thailand by the Department of Entomology, Armed Forces Research Institute of Medical Science (AFRIMS), Bangkok, Thailand, and the Walter Reed Biosystematics Unit (WRBU), Washington, DC. Since 1961, these organizations have been involved in a systematic documentation of the mosquito fauna of Thailand. Thurman (1959) reported 259 species in the Thai fauna, and in the 1980s several lists were published (Apiwathnasorn, 1986; Miyagi *et al*, 1986; Tsukamoto *et al*, 1987) that specifically addressed the Thai fauna. Harrison *et al* (1991) reviewed the records published in those lists and also examined the collection of Thai mosquitoes in the Smithsonian Institution, National Museum of Natural History (NMNH) and at AFRIMS and reported that the known mosquito fauna of Thailand consisted of 410 species. In this study, we report a total of 436 species – the additional species records result from new undescribed species, newly discovered records, a recently described new species, and unnamed species defined by genetic or molecular analyses.

At present, studies on the systematics, biology, distribution and disease relationships of the mosquito of Thailand are continuing, with primary emphasis on malaria vectors (*Anopheles*), dengue vectors (*Aedes*), the vectors of Japanese encephalitis virus in the genus *Culex*, and the vectors of filariasis in the genera *Mansonia* and *Ochlerotatus*. Behavioral, ecological, and distributional data are very important for understanding the relationships of vectors and the pathogens that they transmit. Knowledge of the bionomics and distribution of these mosquitoes has been summarized in several publications (Reid, 1968; Huang, 1972; Harrison and Scanlon, 1975; Sirivanakarn, 1976; Harrison, 1980). However, there are numerous other endemic species in Thailand for which the bionomics and distribution data have not been published. It is important to know the precise distribution and the bionomics of each mosquito species in case new vectors are incriminated or new mosquito-borne pathogens invade or are discovered in a country. The purpose of this work is to provide a general overview of the available published information, a summary of information on the distribution, and the basic immature habitats for all the genera and subgenera extracted from the records of the large identified Thai collections.

The majority of specimens evaluated in this study were collected by personnel in the Department of Entomology, AFRIMS, between 1961 and 1996. A total of 23 genera and 48 subgenera of mosquitoes are now recognized from Thailand. A list of abbreviations used (Reinert, 2001a; Tanaka, 2003) for the genera and subgenera of Culicidae in Thai-

land is provided in Table 1. A checklist of the 436 species of Culicidae that are included in this study is presented in Table 2. A list of the appropriate references for each genus and subgenus is presented in Table 3. The distribution and larval habitats of these genera and subgenera are provided in the following sections. Table 4 provides a summary of the known larval habitats for the different genera and subgenera.

Zoogeography

The Kingdom of Thailand lies roughly between 6 and 21 degrees north latitude, and between 98 to 105 degrees east longitude. The country is located in the center of the mainland of Southeast Asia, and has an area of 198,115 mi² (513,115 km²). Surrounding countries include Myanmar to the west, Lao PDR to the north and east, Cambodia to the southeast, and Malaysia in the south. The Gulf of Thailand is to the south and the Andaman Sea is to the southwest of peninsular Thailand. Thailand is divided into 76 provinces and 926 districts. Bangkok, the capital of Thailand, is in the south-central area just above the Gulf of Thailand. A map of Thailand that includes the provinces is presented in Fig 1.

The number of subregions recognized in Thailand has vacillated between five and six during the last 89 years. Kloss (1915) initially recognized six subregions based on orography, precipitation and floral patterns: North, Northeast (Khorat Plateau), Central Valley, Western Mountains, Southeast, and South (Peninsular). Pendleton and Kingsbury (1962) combined the North and Western Mountain regions and only recognized five subregions. Bunnag (1977) advocated six subregions, but combined the Western mountains and Central Valley into one subregion and split the South into two subregions. At the same time Lekagul and McNeely (1977), working on mammal distributions, recognized the initial 6 subregions of Kloss (1915). We follow Kloss (1915) and Lekagul and McNeely (1977) in recognizing six subregions in Thailand, as presented in Fig 2. These subregions are characterized by unique geographic, precipitation, floral, and faunal features that have significantly affected the zoogeography of the mosquito fauna in the country. Certain genera and subgenera are found throughout the country, whereas others are reported from only certain subregions (Fig 2). Beside the influence of the six subregions on the distributions of the mosquito fauna, other major factors influence species composition. For example, the location of Thailand in the heart of Southeast Asia has had considerable impact on the mosquito species that occur there. Thailand serves as a crossroads for natural as well as unnatural (human) dispersal of flora and fauna from at least three different subregions of the Orient [Indian, Chinese, Sundaic (= Malaysia and Indonesia)] (Harrison and Scanlon, 1975). Also present are introduced species from other