

Mosquito Survey and Taxonomic Studies

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OBJECTIVE : To elucidate the mosquito fauna of Thailand and Southeast Asia, with primary emphasis on the identification of diagnostic characters for the separation of vector species and groups containing vector species of human pathogens.

BACKGROUND : This is a continuation of collaborative efforts begun in the 1960's with the Southeast Asia Mosquito Project (SEAMP), Smithsonian Institution, and currently continued with the Medical Entomology Project (MEP), Smithsonian Institution, Washington, D.C. Earlier efforts were primarily concerned with general surveys for elucidating the mosquito fauna of Thailand. However, by 1967-68 general surveys were discontinued and studies were aimed at target species or species groups of suspected or known vectors of human pathogens. During the period 1970 to the present a large number of excellent taxonomic studies on the mosquitoes of Thailand and Southeast Asia have been published under the auspices of SEAMP, MEP and the U.S. Army Medical Component-SEATO. Despite this progress, serious identification problems, involving suspected and known mosquito vectors of arboviruses, filariasis, and malaria still exist in Thailand. These problems, in conjunction with the resurgence of malaria in Thailand, justify the continuation of basic taxonomic studies.

METHODS : Surveys for target species and species groups are conducted at selected sites and habitats throughout Thailand. These surveys involve the collection of immature and adult mosquitoes, with emphasis placed on reared adults with associated larval and pupal skins, and on progeny adults (with associated larval and pupal skins) reared from eggs oviposited by known wild collected females. Specimens are curated and pinned or slide mounted for further study by investigators in the laboratory, or shipped for study to MEP or other world recognized authorities. Studies primarily consist of an analysis of intra-interspecific variations to identify useful characters for separating the species. Useful diagnostic characters, new species records, and new taxa found in Thailand are prepared for publication and described in scientific journals.

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RESULTS : Numerous progeny broods of species in the *Aedes (Finlaya) niveus* group, collected from Kanchanaburi Province, were curated and sent for study to Dr. Kenneth L. Knight, North Carolina State University. At least 2 new species were involved and one species was recently described by Knight (1). This new species, *harinasutai*, is the species incriminated (as *Aedes niveus* group) as the primary vector of subperiodic *Wuchereria bancrofti* parasites in man in Kanchanaburi Province by Harinasuta *et al.* (2).

A large collection of larvae and reared adults with associated immature skins, of a new species and probable new subgenus of *Aedes* from Kanchanaburi Province, were curated and sent for further study to the Medical Entomology Project (MEP), Smithsonian Institution. In addition, over 4,600 slide preparations of mosquito immatures from Columbia and Panama were mounted and labeled at the request of MEP, and returned to that project for further study.

More than 20 progeny broods of *Anopheles balabacensis* have been reared with associated immature skins. These specimens are being curated and prepared for shipment to E. L. Peyton (MEP), who is currently revising the *leucosphyrus* group in the Oriental faunal Region. *Anopheles balabacensis* is the primary vector of human malaria parasites in Thailand.

During the reporting period, at least 7 species of *Aedes*, *Anopheles* and *Culex* previously unreported from Thailand, were collected and reared. A probable new species of *Culex* was also collected. These specimens are undergoing further study in preparation for publication.

Reports of *Anopheles campestris* a suspected vector of malaria in Thailand, and the collection of *campestris* - like adults, continue to occur in the Chiang Mai Valley in northern Thailand. However, *campestris* may not be present in northern Thailand (3). A recent collection of numerous reared *barbirostris* and "*campestris*" from Chiang Mai is currently being prepared for study. Adult characters to separate these 2 species are known to be unreliable in Thailand, thus an examination of the pupal stage, which exhibits diagnostic characters, is necessary.

In Thailand, *Anopheles philippinensis* may be a secondary vector of human malaria pathogens (unconfirmed by dissection). Reid (4), however, demonstrated that *philippinensis* in Assam, Burma and Malaysia actually consists of 2 species, *nivipes* and *philippinensis*. Current studies at AFRIMS indicate that either Reid's division of *philippinensis* was not justified or that *nivipes* is the common species in Thailand and *philippinensis* is either absent or extremely rare. These studies involve the examination of over 900 ♂ and ♀ progeny with associated immature skins from 54 wild collected females. Reid (4) did not study progeny, and indicated that the study of progeny would confirm or refute the existence of *nivipes* as a valid species.

A major revisionary study was initiated during this period on the *Aedes (Finlaya) kochi* group of species in Thailand and Malaysia. At least 4 species are known from the study area, and one species under study, *poicilius*, is a confirmed vector of *Wuchereria bancrofti* parasites in the Philippines. This group is found primarily in southern Thailand and extends as far north as

Kanchanaburi Province. Adults feed readily on man and the immature stages are found primarily in *Pandanus* axils. To date, 2,040 adults and 1,668 slides have been examined and illustrations of the larval and pupal stages have been prepared. Detailed descriptions are still in preparation.

Manuscripts near completion or completed during the period include : Illustrated keys to the adult domestic mosquitoes of Thailand; Illustrated keys to the genera of adult and larval mosquitoes in Thailand; and the *Myzomyia* series of *Anopheles* (*Cellia*) in Thailand, with emphasis on intra-interspecific variations (Diptera : Culicidae).

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