

Public Abstract

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Graduation Term:FS 2008

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Degree:PhD

Title:THE SEMIAQUATIC HETEROPTERA (GERROMORPHA) OF THAILAND : FAUNISTICS, BIOGEOGRAPHY AND PHYLOGEOGRAPHY

The topography of Thailand is characterized by low-lying agriculture lands abruptly punctuated by discontinuous mountain ranges, with their associated streams and aquatic insect communities. Common members of these communities are semiaquatic Heteroptera (Gerromorpha). Semiaquatic heteropterans were collected from streams and waterfalls in the western mountain range group (Thanon Thong Chai, Tennaserim, Phuket, Nakhon Si Thammarat ranges) and the northeastern mountain range group (Phetchabun, Phu Pan, Sankambeng, Phanom Darak ranges), and lowland ponds adjacent the western mountain range group from March to May 2002, March to June 2003, April to June 2004, May to June 2005, August 2005, January 2006, and June to July 2006. One hundred fifty-eight species representing 31 genera and 5 families of semiaquatic Heteroptera were collected in this study. This includes an undescribed genus, 50 undescribed species, and 7 new country records. Distributional data and a review of *Hydrometra* (Hydrometridae), which is a component of this study, were published in 2003 (Chapter 4). In addition, six of the new species belong to the family Gerridae and recently have been described in separate publications (Chapter 5, 6).

A biogeographic study based on presence/absence data of Gerromorpha was conducted using cluster analysis, two-way indicator species analysis (TWINSpan), and Detrended Correspondence Analysis (DECORANA) to assess the compositional similarity of the Gerromorpha of highland and lowland communities among four mountain ranges north (Thanon Thong Chai & Tennaserim) and south (Phuket & Nakhon Si Thammarat) of the northern limit of the Isthmus of Kra and among eight mountain ranges in northern, central, eastern, northeastern, and southern Thailand. The results of these analyses indicate that the species compositions of southern mountain ranges were distinctly similar to each other and substantially different from those of the mountain ranges north of the northern limit of the Isthmus of Kra. In contrast, the analyses revealed no biogeographic patterns of the Gerromorpha community of lowland ponds that corresponded with their geographic location. In analyses based on species compositions of eight mountain ranges, three distinct mountain range groups were recognized, which corresponded with geographic regions: northern and central (Thanon Thong Chai, Tennaserim, & Phetchabun), southern (Phuket & Nakhon Si Thammarat), and eastern (Sankambeng, Phanom Darak, & Phu Pan) mountain ranges.

A phylogeographic study was conducted based on a ca. 750 bp fragment of the mitochondrial gene cytochrome oxidase c subunit 1 (COI) to determine if the genetic structure among populations of *Ptilomera tigrina* and *Onychotrechus esakii* distributed along the western mountain range in Thailand is related to natural history differences. Genetic differences among populations of each species were determined by standard genetic parameters, pairwise genetic distance ( $F_{st}$ ), Analysis of Molecular Variance (AMOVA), haplotype networks, and phylogenetic analysis. For *P. tigrina*, the results indicated that the populations north of and in the Isthmus of Kra differed from each other genetically, but populations within each side are similar to one to another. For *O. esakii*, the results revealed that several possible cryptic species exist in southern Thailand.