

Distribution and Ecology of Ectoparasites of Vertebrates in Southeast Asia.

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**OBJECTIVE:** To assemble information on the geographic and seasonal distribution and the host-parasite relationships of the ectoparasites of vertebrates in Southeast Asia.

**DESCRIPTION:** Ectoparasites are removed from mammals, birds and other vertebrates collected in selected study sites and in connection with various disease studies in Thailand and elsewhere in Southeast Asia. The ectoparasites are preserved, sorted into major groups and identified at SMRL or submitted to specialists abroad for identification. Aliquots of collections used for inoculations of test animals are given priority in these identifications. Studies on the taxonomy and ecology of the various vertebrate hosts are also conducted.

**PROGRESS:** During this period ectoparasites were collected from small mammals trapped in three habitats representative of a major part of Thailand—dry evergreen forest, deciduous dipterocarp forest and land under agricultural use—to determine the types of ectoparasite faunas associated with these habitats. Grids of 81 trap sites have been established in each of the first two types of habitat at the Trend site at Sakaerat in Nakhon Rachasima province, and collections of mammals have been made on four consecutive nights each month to measure the response of ectoparasite populations to seasonal changes. A total of 432 collections of mammals have been made in the three areas to date. Analysis of data on the relative abundance, habitat, host and seasonal distribution of ectoparasite species from these areas is underway.

The immature stages of four species of ticks collected during this period, Demacenter auratus, Haemaphysalis bandicota, Rhipicephalus sanguineus and Ixodes granulatus were reared through to the adult stage at SMRL. Eggs have been obtained from the first three species, and it is anticipated that colonies of these species will be established for use in insecticide susceptibility tests and possible virus and rickettsial transmission studies. Host and distribution records on ticks collected in Thailand by SMRL and from other sources have been compiled and a summary of these data for the 48 species recorded from the kingdom is given in Table 1.

Three species of trombiculid mites described from Thailand, but not previously represented in SMRL collections, were identified during this period. These species were 1) Ascoshongastia (Laurentella) kittii from Rattus rattus, R. sabanus and R. fulvescens in Chiang Mai, 2) Sasatrombicula siamensis from Rhinolophus luctus in Chiang mai, and 3) Whartonia prima from Hipposideros armiger in Chantaburi province. A fifth species, Leptotrombidium (L.) nakatae collected in Chiangmai, constitutes a new record for Thailand.

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Table 1. A checklist of the ticks recorded from Thailand

	Locality	Host
Suborder IXODOIDEA Family IXODIDAE Subfamily IXODINAE IXODES		
<u>Ixodes (Lepidixodes)</u> <u>kopsteini</u> (2) (4) Ref: Kohls and Clifford 1968	Saraburi  Chieng Mai, Chieng Rai, Nan, Udon Thani, Ubon Ratchathani, Nakhon Ratchasima, Prachinburi, Surat Thani, Trang, Song Khla, Pattani, Yala, Narathiwat, Phuket	<u>Tadarida plicata</u> , <u>Iaphozous theobaldi</u>  <u>Tupaia glis</u> , <u>Suncus murinus</u> , <u>Homo sapiens</u> , <u>Tamias macclellendi</u> , <u>Callosciurus erythraeus</u> , <u>C. finlaysoni</u> , <u>C. notatus</u> , <u>Dremomys rufigenis</u> , <u>Menetes berdmorei</u> , <u>Mus nitidulus</u> , <u>Bandicota sp.</u> , <u>R. rattus</u> , <u>R. exulans</u> , <u>R. surifer</u> , <u>R. sladeni</u> , <u>R. cremoriventer</u> , <u>R. mülleri</u> , <u>R. sabanus</u> , <u>R. niviventer</u> , <u>R. berdmorei</u> , <u>Felis bengalensis</u>
<u>Ixodes spinicoxalis</u>	Chieng Mai	<u>Pitta oatesi</u> , <u>Muscicapa grandis</u> , <u>Tupaia glis</u>
<u>Ixodes paradoxus</u> (4)	information not available	

Table 1. (Continued)

	Locality	Host
<u>Ixodes radfordi</u>	Chieng Mai	<u>Rattus surifer</u>
Subfamily RHIPICEPHALINAE BOOPHILUS		
<u>Boophilus microplus</u>	Chieng Mai, Narathiwat	"cow"
RHIPICEPHALUS		
<u>Rhipicephalus sanguineus</u>	Kanchanaburi, Nakhon Ratchasima, Prachinburi, Phra Nakhon	<u>Hylobates lar</u> , <u>Homo sapiens</u> , <u>Rattus rattus</u> , <u>Bandicota bengalensis</u> , <u>B. indica</u> , <u>Canis fami-</u> <u>liaris</u>
<u>Rhipicephalus haemaphysaloides</u>	Chieng Mai, Udon Thani, Ubon Ratchathani, Nakhon Ratchasima, Chon Buri, Surat Thani	<u>Macaca irus</u> , <u>Homo sapiens</u> , <u>Bandicota indica</u> , <u>Rattus rattus</u> , <u>Rattus berdmorei</u> , <u>Mus caroli</u> , <u>Mus cervicolor</u> , <u>Lepus siamensis</u> , <u>Felis dome-</u> <u>sticus</u> , <u>Canis familiaris</u> , "Goat", "Cattle"
Subfamily AMBLYOMMINAE HAEMAPHYSALIS		
<u>Haemaphysalis (Haemaphysalis) capri-</u> <u>cornis</u> (2)	Extreme southern provinces	<u>Capricornis sumatraensis</u>

Table 1. (Continued)

	Locality	Host
<u>Haemaphysalis (Haemaphysalis) atherurus</u> (4) (2) Ref: Hoogstraal et al 1965a	Loei	<u>Atherurus macrourus</u>
<u>Haemaphysalis (Haemaphysalis) formosensis</u> (4) group	Information not available	
<u>Haemaphysalis bispinosa</u> spp (4)	Information not available	
<u>Haemaphysalis canestrinii</u> (Supino) (3,4)	Chieng Mai, Chieng Rai, Cholburi	<u>Bandicota indica</u> , <u>Melogale personata</u> , <u>Viverricula indica</u>
<u>Haemaphysalis indica</u> group (4) <u>Haemaphysalis near indica</u> group (4)	Information not available	
<u>Haemaphysalis (Kaiseriana) anomala</u> Warb. 1913 ( <u>H. cornigera anomala</u> Warb. 1913) (4) (2) Ref: Hoogstraal et al 1967	Chieng Mai, Loei	<u>Homo sapiens</u> , <u>Bubalus bubalus</u>
<u>Haemaphysalis (Kaiseriana) papuana</u>	Surat Thani, Yala	<u>Copsychus saularis</u> , <u>Rattus bowersi</u> , <u>R. rattus</u> , <u>R. surifer</u>

Table 1. (Continued)

	Locality	Host
<u>Haemaphysalis (Kaiseriana) nachatrami</u> (2, 4) Ref: Hoogstraal <u>et al</u> 1965b	Satun, Trang	<u>Homo sapiens</u> , <u>Tapirus indicus</u>
<u>Haemaphysalis (Kaiseriana) kinneari</u> (4)	Information not available	
<u>Haemaphysalis (Kaiseriana) hystricis</u> (2,4) Ref: Hoogstraal <u>et al</u> 1965c	Chiang Mai	<u>Homo sapiens</u> , <u>Arctonyx collaris</u>
<u>Haemaphysalis (Kaiseriana) obesa</u> (4) (2) Ref: Hoogstraal <u>et al</u> 1966	Sakhon Nakhon, Nakhon Ratchasima, Satun	<u>Sus scrofa</u> , <u>Homo sapiens</u> , <u>Tapirus indicus</u>
<u>Haemaphysalis (Kaiseriana) semermis</u> (2) Ref: Hoogstraal <u>et al</u> 1965b 1966	Satun (holotype)	<u>Tapirus indicus</u>
<u>H. (K.) lagrangei</u>	Thailand	Unknown
<u>Haemaphysalis (Rhipistoma) asiaticus</u> (Supino) ( <u>H. dentipalpis</u> Warb & Nutt 1909)	Chiang Mai, Loei	<u>Civet</u> , <u>Felis bengalensis</u>

Table 1. (Continued)

	Locality	Host
<u>H. (Rhipistoma)</u> near <u>heinrichi</u>	Nakhon Ratchasima, Phra Nakhon	<u>Canis familiaris</u> , <u>Melogale personata</u>
<u>Haemaphysalis (Rhipistoma) bandicota</u>	Chieng Mai, Saraburi, Cholburi	<u>Bandicota indica</u> , <u>Bandicota</u> sp.
<u>Haemaphysalis (Rhipistoma) doenitzj (4)</u>	Bang Phra, Chol Buri	<u>Acridotheres tristis</u> .
<u>Haemaphysalis (Rhipistoma) koningsbergeri (4)</u>	Malaya (Berak)	<u>Arctogalidia trivirgata</u>
<u>Haemaphysalis (Rhipistoma) ornithophila (2)</u>	Information not available	
Ref: Hoogstraal and Kohls 1959		
<u>Haemaphysalis megaleimae (4)</u>	Information not available	
<u>Haemaphysalis traguli (2, 4)</u> Oudemans 1928 (= <u>H. monospinosa</u> Krijgsman & Ponto 1932)	Khon Kaen	<u>Tragulus javanicus</u>
Ref: Hoogstraal 1964 a		
<u>Haemaphysalis wellingtoni</u>	Chieng Mai, Nan Phra, Nakhon Ratchasima, Saraburi.	<u>Gallus gallus</u> , <u>Centropus sinensis</u> , <u>Glaucidium cuculoides</u> , <u>Pitta moluccensis</u>

Table 1. (Continued)

	Locality	Host
<u>Haemaphysalis (Haemaphysalis) proba-</u> <u>bly darjeelingi</u>	Prachinburi	<u>Melogale personata</u>
DERMACENTOR Koch 1844		
<u>Dermacentor auratus</u>	Nakhon Ratchasima, Saraburi, Trang, Song Khla, Yala, Narathiwat	<u>Tupaia glis</u> , <u>Homo sapiens</u> , <u>Mus cervicolor</u> , <u>R. sladeni</u> , <u>R. rattus</u> , <u>R. bowersi</u> , <u>R. niviven-</u> <u>ter</u> , <u>R. surifer</u> , <u>R. sabanus</u> , <u>Cannomys</u> sp. <u>Melogale personatus</u>
AMBLYOMMA Koch 1844	Chieng Mai, Udon Thani, Nakhon Ratchasima	<u>Homo sapiens</u> , <u>Manis javanica</u>
<u>Amblyomma sublaeve</u> Neumann 1899 (= <u>A. javanense</u> <u>Supino</u> 1897)		
<u>Amblyomma helvolum</u>	Samut Prakan, Chol Buri, Surat Thani, Nara- thiwat	<u>Varanus bengalensis</u> , <u>Varanus salvator</u> , <u>Va-</u> <u>ranus</u> sp., <u>Python reticulat</u>
<u>Amblyomma geomydae</u>	Chanthaburi, Nakhon Si Thammarat	<u>Lacedo pulchella</u> , <u>Pitta caerulea</u> , <u>Zoothera</u> <u>marginata</u>
<u>Amblyomma cordiferum</u> (2)	Information not available	

Table 1. (Continued)

	Locality	Host
<u>Amblyomma testudinarium</u> (1)	Information not available	
<u>Amblyomma cyprium</u> ?	Surin	Turtle
APONOMMA		
<u>Aponomma gervaisi</u>	Ratchaburi, Surat Thani	<u>Varanus</u> sp.
<u>Aponomma lucasi</u>	Chieng Mai, Khon Kaen, Surat Thani	<u>Varanus</u> sp. <u>Python reticulatus</u> , <u>Naja naja</u> <u>Rattus rattus</u>
<u>Aponomma pattoni</u> ?	Nakhon Ratchasima, Khon Kaen	<u>Naja naja</u>
FAMILY ARGASIDAE		
ARGAS		
<u>Argas (Carios) pusillus</u> Kohls	Chieng Mai	<u>Pelecanus philippinensis</u>
<u>Argas (Parsicargas) persicus</u>	Samut Parkarn	Bat
<u>Argas (Parsicargas) robertsi</u> (2)	Pathumthani	<u>Anastomus oscitans</u>
Ref: Hoogstraal et al. 1968		
ORNITHODOROS		
<u>Ornithodoros</u> sp. ( <u>Reticulinosus</u> <u>ba-</u> <u>tuensis</u> group)	Chieng Mai, Prachin Buri	<u>Rousettus leschenaulti</u>

Table 1. (Continued)

	Locality	Host
<u>Ornithodoros (Alectorobius) capensis</u>	Chol Buri, Rayong	<u>Sterna sumatrana</u> , <u>Sterna anaethetus</u> , <u>Rousettus leschenaulti</u>
<u>Ornithodoros</u> sp. (Faini group)	Saraburi	<u>Scotophilus heathii</u> , <u>Rousettus leschenaulti</u>
<u>Ornithodoros kelleyi</u>	Thailand	

(1) Reported only in SMRL Annual Progress Report of 1964

(2) Reported in Literature

(3) Represented in SEATO Museum Collection

(4) Represented in RML Museum Collection from SEATO specimens