

SEATO MEDICAL RESEARCH STUDY ON Rickettsial Diseases in Thailand.

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Objective:

To determine the distribution and seasonal variation of Rickettsial diseases in Thailand; identify arthropod vectors and mammal reservoirs and alternate hosts, and serve as required as consultative laboratory.

Description:

A search for evidence of infection of man and other animals by rickettsiae of scrub typhus, murine typhus, Q-fever and the spotted fever group is being carried out in Thailand by means of isolation attempts and serologic methods.

Small mammals (usually rodents) are trapped in selected areas. Ectoparasites are collected, identified and pooled. Tissue specimens and ectoparasite pools are inoculated into white mice or guinea pigs for isolation attempts. Domestic animals, and in some cases, human residents, are bled for serologic study.

In a few instances blood from hospitalized human cases of fever of unknown origin (F.U.O.) were inoculated into white mice for attempted isolation.

Progress:

1. Scrub Typhus. In order to complete the seasonal study of scrub typhus in animals from selected area, trips to Arranyaprathet, Nan and Chiang Rai were conducted during summer, winter and rainy season.

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Leptothrombidium (L) dellense chigger population is highest during the rainy season which corresponds to the prevalence of scrub typhus infection in trapped animals. At Nan, Loei and Chieng Rai where Leptothrombidium (L) scutellaris are present, an attempt to isolate scrub typhus rickettsiae from this chigger and the small mammals trapped in the same areas were unsuccessful (Table I). This chigger is known to be a main vector in Japan.

Attempts to recover R. tsutsugamushi from patients with F.U.O. were made at Bangkok Army Hospital, Overbrook Hospital, Chieng Rai and Korat Provincial Hospital. Fifteen strains of R. tsutsugamushi were isolated from 149 specimens of blood (Table II). It should be noted that at Korat, where a scrub typhus outbreak occurred in 1965, 11 strains of R. tsutsugamushi were isolated from 91 civilian patients with F.U.O. during November-December 1966. No skin rashes were observed and only 3 of 15 patients exhibited eschar. It is likely that the majority of scrub typhus cases escape physicians' recognition.

2. Murine Typhus. Commensal rats and their fleas were collected during the rickettsia survey trips, and processed to recover R. mooseri. Twenty-nine strains tentatively identified as R. mooseri were isolated from 1,077 rats trapped in 10 provinces (Table III), indicating a wide distribution of this rickettsia in Thailand.

Definitive isolation of R. mooseri was made from a patient diagnosed as having bronchitis at Chieng Rai and presumptive isolation was also made from another patient diagnosed as enteric fever at Korat. Rash, supposedly the most characteristic sign, was not observed in these 2 patients.

3. Q-fever. During a scrub typhus survey, blood was taken from trapped animals in various provinces for Q-fever serology. One thousand, one hundred and thirty three animals, mostly rodents, were examined by mean of CF test for Q-fever using Nine Mile strain Q-fever antigen (Lederle) with 6.1% positive. (Table IV).

Attention should be drawn to the Bandicoot rats (Bandicota indica). From 32 rats of this species collected in Lopburi, 8 had CF antibodies to Q-fever, and six strains of Coxiella burnetii were isolated. This is the only kind of rat from which Q-fever rickettsiae have been isolated in Thailand.

Serological survey of large domestic animals was carried out. Four thousand three hundred and ninety four cattle, 259 sheep, 730 goat and 1105 dog sera were examined for the evidence of Q-fever infection (Table V). The high rate of seropositives found among dogs in Bangkok and Samutsakorn awaits confirmation. It is possible this unusual finding may be spurious. Studies relative to the probability of transmission of Q-fever to man are being conducted.

4. Spotted Fever. An attempt to recover spotted fever group rickettsia from 684 rodents tissue and 2099 ticks collected in 10 provinces was unsuccessful.

TABLE I

ISOLATION OF R. TSUTSGAMUSHI FROM SMALL MAMMALS TRAPPED AT NAN, LOEI AND CHIENG RAI

Locality	Specimen	Number Animals	Pools Tested	Pools Positive	Percentage
Chieng Rai	Rat Chigger	193	94	0	0
		200	4	0	0
Loei	Rat Chigger	189 —	82 —	1 —	0 —
Nan	Rat Chigger	56	29	2	4
		1075	7	0	0

TABLE II

ISOLATION OF R. TSUTSUGAMUSHI FROM PATIENTS WITH F.U.O.

Locality	No. Specimen of Blood	No. Isolations
Chieng Rai Hospital	53	3 (5.7%)
Bangkok Army Hospital	6	1 (16%)
Korat Hospital	90	11 (12%)
Total	149	15 (10%)

TABLE III

TENTATIVE ISOLATION OF RICKETTSIA MOOSERI FROM COMMENSAL RATS
(RATTUS RATTUS, R. EXULANS AND RAT FLEAS (XENOPSYLLA CHEOPIS
 IN VARIOUS LOCALES IN THAILAND.

Locality	Specimen Tested	Total No. Tested	No. of Pools Tested	No. of Pools Positive for <u>R. mooseri</u>	Source of the Isolate
Chieng Rai	Rats	115	34	0	<u>Xenopsylla cheopis</u>
	Fleas	164	9	1	
Ubol	Rats	95	23	4	<u>4.R. exulans</u>
	Fleas	98	4	0	
Nan	Rats	17	4	2	<u>2-R. exulans</u>
	Fleas	28	6	0	
Loei	Rats	92	25	4	<u>1. R. rattus</u> <u>3. R. exulans</u> <u>X. cheopis</u>
	Fleas	503	11	1	
Samutsakorn	Rats	69	16	1	<u>R. exulans</u>
	Fleas	26	7	0	
Korat	Rats	285	30	5	<u>R. exulans</u>
Nongkai	Rats	91	16	5	<u>R. exulans</u>
Udorn	Rats	145	21	4	<u>R. exulans</u>
Tak	Rats	86	17	3	<u>R. exulans</u>
Chiengmai	Rats	82	18	1	<u>R. exulans</u>
Total Rats		1,077	204	29	
Total Fleas		819	37	2	

TABLE IV

Q-fever Complement Fixing Antibody* in Sera Collected from Small Mammals in 11 Provinces of Thailand.

Mammal	Chieng-Rai	Nan	Loei	Udonn	Nakorn panom	Ubol	Lopburi	Arranya pathet	Yala	Pattani	Narathi was	Totals
T. glis		0/19**	5/26			0/23	0/5	3/8	0/3	1/1	0/6	9/91
R. rattus	2/72	0/4	1/38	21/286	6/12	0/19	4/38	0/18	1/26	0/13	2/32	37/558
R. exulans	2/44	0/7		0/11	8/65	0/11	0/4	0/10	0/5	0/2	0/5	10/164
R. rajah		1/16	1/19	0/1		0/27		0/2	0/1	0/8	1/39	8/113
R. berdmorei	0/1	0/2	0/8	0/17				0/3				0/31
R. niviventer			0/4							0/1		0/5
R. sabanus											0/1	0/1
R. cremoriventer						0/3			0/1	1/2		1/6
R. norvegicus								0/52				0/52
B. indica	0/3	0/1	0/6	0/3			8/36	1/9				9/58
S. murinus								8/28				8/28
M. berdmorei	0/1	0/4		0/1			0/1	0/1				0/8
A. javanica	1/3		0/1	0/2								1/6
M. personata			0/2						0/1	0/2	0/1	0/2
C. notatus												0/1
C. caniceps									0/1	0/2	0/2	0/5
Monitor											0/2	0/2
R. mulleri											0/1	0/1
Bird											0/1	0/1
TOTAL	5/124	1/53	7/104	21/321	14/77	0/83	12/84	12/131	1/37	2/29	3/90	78/1133

* sera reactive at a 1/5 dilution.

** Number positive/number tested.

TABLE V

PREVALENCE OF Q-FEVER COMPLEMENT FIXING ANTIBODY IN DOMESTIC ANIMALS,
BY SPECIES AND LOCALITY.

Species	No. Tested	Positive	Percentage
Cattle	4394	266	6.05
Sheep	259	8	3.09
Goat	730	17	2.33
Dog	1105	310	28.05
Total	6488	591	39.52

DISTRIBUTION OF Q-FEVER IN DOMESTIC ANIMAL IN THAILAND

Province	Cattle	Sheep	Goat	Dog	Horse
Nan	1/124	—	—	—	—
Lopburi	3/122	—	—	—	—
Samutsakorn	—	—	—	11/33	—
Cholburi	—	—	—	—	0/114
Bangkok	241/2609	3/59	3/48	299/1072	—
Nakornpathom	—	2/72	2/135	—	—
Rajburi	1/20	2/40	0/40	—	—
Petchburi	—	2/33	2/33	—	—
Lampang	5/137	—	—	—	—
Uthaithani	1/39	—	—	—	—
Lampoon	0/135	—	—	—	—
Sukothai	0/68	—	—	—	—
Pitsanulok	0/130	—	—	—	—
Nakornsawan	0/179	—	—	—	—
Karnchanaburi	—	0/55	0/113	—	—
Petchaboon	0/24	—	—	—	—
Pichit	0/33	—	—	—	—
Singburi	1/129	—	—	—	—
Præ	1/409	—	—	—	—
Korat	1/24	—	—	—	—
Srisaket	0/19	—	—	—	—
Chalnart	1/132	—	—	—	—
Maurklek	0/61	—	—	—	—
Total	266/4394 6.05%	8/259 3.09%	17/730 2.33%	310/1105 28.05%	0/114 —