Studies on Filariasis in Small Mammals in Northeast Thailand

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OBJECTIVE : To establish a consistently reproducible, readily available, genetically controlled laboratory animal model for the study of infection with nematodes of the Superfamily *Filariaidea*.

BACKGROUND : The need for a consistently reproducible laboratory animal model for studies of infection with nematodes of the Superfamily *Filariaidea* has been expressed (1). A mosquito-transmitted filaria-laboratory rat system would fulfil this requirement and is the ultimate goal of these studies. Attempts to transmit *Brugia tupaia* through mosquitoes to various laboratory animals were made at the SEATO Medical Research Laboratory (SMRL) in 1969 and 1970 (2, 3) but were unsuccessful. One mosquito-transmitted filarial parasite, *Brienlia booliati*, has been reported in Malaysia and laboratory rats have been successfully infected with this nematode at the University of Singapore (4, 5). Additionally, one report of mosquito transmission of *Brugia pahangi* to mice using *Aedes togoi* at the University of Singapore is reported (6).

A preliminary study in which 1,694 wild rodents in Thailand were trapped and screened for microfilaria was undertaken by Dill, *et al.* (7). Results of this study revealed the presence of unreported filarial nematodes of several species. Mosquito transmission studies utilizing these new species of microfilaria were unsuccessful. Subsequent to this study, one of the new species of microfilaria has been described and named *Dunnifilaria dilli*. (8).

This study is modeled after the earlier study by Dill, *et al.* (7).

METHODS : Small mammals were live-trapped in the area of Pak Chong, using bananas as bait. The animals were screened in the field by examining blood films for the presence of microfilaria. Blood was obtained by either orbital bleeding or by cardiac puncture. The number of each species trapped and the number of positive for microfilaria (regardless of species) is seen in Table I.

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Thirty-three of the positive animals were transported to our laboratory for definitive identification of the microfilaria and further studies. Four animals died either during the trip to the laboratory or soon after arrival. Blood smears from twenty nine of the animals were sent to Dr. Mak Joon Wah for identification of the microfilaria. The results of these identifications are seen in Table II.

Periodicity studies were undertaken to determine the optimum time to feed mosquitoes for transmission studies. Microfilaria counts were performed every two hours for twenty-four hours using the method of Ramachandran (9). The following species of animals (with the number of animals of each species in parentheses) were used in the periodicity studies : *Rattus koratensis* (2), *Rattus rattus* (1), *Rattus sabanus* (2), *Rattus surifer* (1), *Menetes berdmorei* (1), *Tupaia glis* (2).

RESULTS : Results of the microfilaria counts of the periodicity studies are seen in Table III. Numbers of animals used in this study are not sufficient to establish a definite cyclic pattern. Periodicity studies involving more animals will be conducted in the coming year.

Efforts in the future will concentrate on *Dunnifilaria dilli* and *Dunnifilaria ramachandrani*. Studies will be directed at description of the life cycle of these filarids and trials using initially *Aedes togoi* and *Aedes albopictus* for mosquito infectivity and transmission studies.

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Table I.

Species	Number Caught	Number Positive
Bandicota savilei	3	0
Hylomys suilus	10	0
Menetes berdmorei	26	3
Menetes cerviollor	15	0
Rattus berdmorei	1	0
Rattus bukit bukit	33	0
Rattus exulans	2	0
Rattus koratensis	19	5
Rattus losea	1	0
Rattus rattus	153	5
Rattus rapid orbus	1	0
Rattus sabanus	37	19
Rattus surifer	159	7
Tupaia glis	90	25
Total	550	64

Table II.

Animal Species	Microfilaria Species			
	Dunnifilaria ramachandrani	*Dunnifilaria dilli*	*Orugia tupaia*	*Brienlia sergenti*
*Rattus sabanus**	10	4	0	0
Rattus surifer	0	3	0	0
*Rattuskoratensis**	4	2	0	0
Rattus rattus	1	0	0	0
Menetes berdmorei	0	0	0	1
Tupaia glis	0	0	6	0

* Total is more than 100% because both species of microfilaria present in the same animal in some cases.

Table III

Microfilaria Count 10^3 /ml. in Rodent Blood

Animal No.	Microfilaria Species	Time Recorded											
				12.00	14.00		18.00	20.00	22.00	24.00	02.00	04.00	06.00
791	D. ramachandrani	564	0.2	524.6	408.4	580	177	396	550	500	270	569	560
628	D. ramachandrani	229.6	212.6	463	477.4	437.2	475.2	427.8	624	471.6	204.4	459	354.8
741	D. ramachandrani	5.6	4.2	8.0	8.8	8.6	11.5	10.8	4.8	11.6	21.0	13.0	1.2
538	D. ramachandrani	258	206	344.4	249.6	280.8	411.4	375.4	75.4	39.0	240.8	419	382
427	D. ramachandrani	99.6	156	64.4	178.2	121.4	56.8	154	56	157.2	157	151.6	77.4
628	D. dilli	93.6	168.6	314.4	316.4	284.4	332.4	315.6	397.4	346.2	156.8	316.4	303.6
427	D. dilli	41	69	38.8	75.6	53.6	26.4	67.6	27.2	45.4	56	55.6	49.8
538	D. dilli	115.8	99	154.2	130.2	147	182.2	185.8	11.2	18	28.6	48	55
484	D. dilli	12.6	19	20.2	31.2	9.8	19.2	11.2	11.2	17	5.4	10.2	11.2
772	B. sergentic	0.2	0.4	0.4	0.4	02.	0.2	0	0	0	0	0	0.2
331	B. tupaiae	0	0	0	0	0	0	0	0.8	0.2	0.2	0	0
522	B. tupaiae	0	359.4	0.2	0.2	0.8	0	0.2	0	0	0	0	0

Animal No.	Species
791	Rattus koratensis
628	Rattus koratensis
741	Rattus rattus
538	Rattus sabanus
427	Rattus sabanus
484	Rattus surifer
772	Menetes berdmorei
331	Tupaia glis
522	Tupaia glis