

STUDIES ON THE PREVALENCE OF MALAYAN FILARIASIS IN SOUTH THAILAND†

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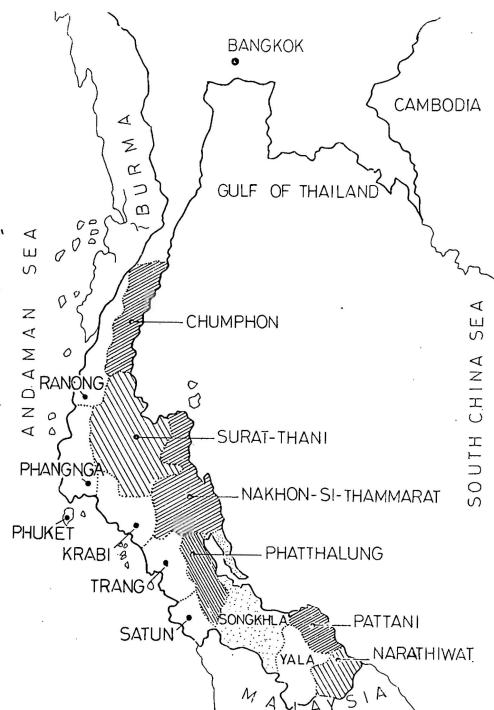
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Malayan filariasis has been known to be prevalent in South Thailand and its endemic areas are confined to those provinces along the eastern coast of the peninsula (Harinasuta *et al.*, 1970). This paper presents the results of the survey on the prevalence and distribution of malayan filariasis in the provinces along the eastern coast as well as the western coast of the peninsula of Thailand.

Description of the Area

Geographically the southern region of Thailand is situated between latitude 7°N - 12°N and bounded by the Gulf of Thailand and the South China Sea on the east and the Andaman Sea on the west. There are chains of hilly and mountainous areas along the western part of the peninsula with dense evergreen forests covering about a half of the region. The semi-forested terrain gradually sloping towards the east coastal plains. The eastern coast provinces include Chumphon, Surat-Thani, Nakhon-Si-Thammarat, Phatthalung, Songkhla, Pattani, Narathiwat and Yala, while the western coast provinces are Ranong, Phangnga, Phuket, Krabi, Trang and Satun, a total of 14 provinces (Map 1). Most of the areas on the eastern side of the peninsula are low lying lands for cultivation of rice and other agricultural crops, coconut and rubber plantations. Many permanent small and large swampy areas with various kinds of aquatic plants, grasses and weeds are found throughout the year. Besides this,

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Map 1—Showing peninsula of South Thailand with 8 provinces on the east coast and 6 provinces on the west coast.

many temporary small swamps are found scattered all over the area, which usually become dry during the dry season (February-May). No permanent swampy areas are found in the western section but small temporary swamps may be located only during the rainy season (June-January). There are many tin mines in each province in this area. The climate in the whole peninsula is of a noticeably more tropical character than the other parts of the country. The rainfall extend for about 8-9 months of the year and thus there is always a high relative humidity

in the area. The mean monthly temperature varies between 24°C and 31°C.

The peninsula covers an area of 64,443 square kilometers and is divided into 14 provinces which are subdivided into 113 districts, 910 cantons, and 6,082 villages. The population in each province varies from about 60,000 in Ranong province to about 930,000 in Nakhon-Si-Thammarat province. The majority of the people are Thai who earn their living by cultivation of rice and other agricultural crops, coconut and rubber plantations, fishing and tin mining.

Ten provinces in the peninsula of South Thailand were included in our survey for malayan filariasis, i.e. Songkhla, Pattani, Narathiwat and Yala provinces of the eastern coast, and Ranong, Phangnga, Phuket, Krabi, Trang and Satun provinces of the western coast. Random samples were selected from villagers in each district of the province. Special attention was made particularly in the villages with cases of elephantiasis, whereby information was obtained from the local health officers in the provinces. Some districts which had no elephantiasis cases and the areas which were considered as insecure for travel were excluded from the study.

MATERIALS AND METHODS

The surveys were made during 1970-1971. The investigating team from the Faculty of Tropical Medicine, Bangkok, travelled to the southern provinces by car and established a temporary field station in each province. Blood surveys on the villagers in each district of the province were made during 19.00-22.00 hours, the procedures of which were the same as described elsewhere (Harinasuta *et al.*, 1964). The intensity of *B. malayi* microfilariae in positive cases was also studied. Elephantiasis and other symptoms and signs of filariasis were noted in each individual.

The results obtained were recorded and later analysed for the prevalence of the infection according to age and sex distribution.

RESULTS

SONGKHLA (Total population being about 621,000 persons in 10 districts)

Prevalence of infection: The blood examinations were made in 1971 on 7,876 persons in 9 districts of Songkhla province (about 1.3% of total population), i.e. in Muang, Hat-Yai, Chana, Na-Thawi, Ranot, Rattaphum, Saba-yoi, Sathing-Phra, and Tepha districts. Six persons (0.08%) were positive for microfilariae of *B. malayi*. Twenty cases (0.25%) of elephantiasis of legs were found in the area. The filariasis rate was 0.33%. It was observed that filariasis cases were found spread out in nearly all of the districts surveyed. The results are shown in Table 1.

Since not many cases of malayan filariasis were found in this province, further analysis with regard to age and sex distribution and intensity of microfilariae in the positive cases was considered unnecessary.

PATTANI (Total population being about 330,000 persons in 9 districts)

Prevalence of infection: The blood examinations were made in 1970 on 4,904 persons in 5 districts of Pattani province (about 2.0% of the total population), i.e. in Muang, Panare, Yaring, Sai-Buri and Mayo districts. Seventy-six persons (1.6%) were found to harbour microfilariae of *B. malayi*. There were 50 cases of elephantiasis (1.0%), all in the legs. The filariasis rate was 2.6%. It was noted that the microfilarial rates ranged from 0.1% in Mayo and Sai-Buri districts to 6.2% in Yaring district. The results are shown in Table 2.

Age and sex distribution: The age-group and sex distribution of the positive microfila-

Table 1

Showing the results of blood examination for *B. malayi* microfilariae and for elephantiasis amongst the population in 9 districts of Songkhla province in 1971.

District	No. exam.	Mf. positive		Elephantiasis		Filariasis rate
		No.	Per cent	No.	Per cent	Per cent
Muang	364	1	0.27	0	0	0.27
Hat-Yai	768	2	0.26	0	0	0.26
Chana	1,077	0	0	1	0.09	0.09
Na-Thawi	557	3	0.54	2	0.35	0.90
Ranot	1,648	0	0	10	0.60	0.60
Rattaphum	513	0	0	0	0	0
Saba-Yoi	725	0	0	1	0.14	0.14
Sathing-Phra	1,287	0	0	2	0.16	0.16
Tepha	937	0	0	4	0.43	0.43
Total	7,876	6	0.08	20	0.25	0.33

Table 2

Showing the results of blood examinations for *B. malayi* microfilariae and for elephantiasis amongst the people in 5 districts of Pattani province in 1970.

District	No. exam.	Mf. positive		Elephantiasis		Filariasis rate
		No.	Per cent	No.	Per cent	Per cent
Muang	1,155	10	0.9	1	0.08	1.0
Panare	1,520	19	1.3	18	1.2	2.4
Yaring	722	45	6.2	29	4.0	10.2
Sai-Buri	700	1	0.1	2	0.3	0.4
Mayo	807	1	0.1	0	0	0.1
Total	4,904	76	1.6	50	1.0	2.6

ria cases are shown in Table 3. The microfilariae were found in all age-groups, the rates of which ranged from 0.3% in the 1-10 year group to 5.1% in the 61-70 year group. Those 3 microfilarial positive cases whose ages below 10 years of age were all girls. The oldest case was a male 75 years old. The ratio of males to females was 1:0.8 (1.7% : 1.3%).

The elephantiasis cases according to age and sex are also shown in Table 3. The elephantiasis of legs was found in persons in

the age-group of 31-40 years or over, the rates of which ranged from 2.1% to 7.0%. The ratio of males to females was 1:1.3 (0.9% : 1.2%).

Intensity of microfilariae: The intensity of microfilariae in 76 positive cases was studied. The results are shown in Table 4. The mean microfilarial density among positive cases was 11.7 microfilariae per 40 c.mm blood and the mean microfilarial density of total people examined was 0.2 per 40 c.mm blood.

Table 3

Showing the microfilarial rates of *B. malayi* infection and elephantiasis cases amongst the population in 5 districts of Pattani province in 1970, according to age and sex.

Age in years	Males				Females				Both sexes			
	No. exam.	Positive No.	%	No. with elephantiasis	No. exam.	Positive No.	%	No. with elephantiasis	No. exam.	Positive No.	%	No. with elephantiasis
1-10	480	0	0	0	401	3	0.7	0	881	3	0.3	0
11-20	798	9	1.1	0	583	4	0.7	0	1,381	13	0.9	0
21-30	861	16	1.9	0	298	4	1.3	0	1,159	20	1.7	0 (0%)
31-40	298	10	3.4	6	239	4	1.7	5	537	14	2.6	11 (2.1%)
41-50	225	7	3.1	9	203	2	1.0	7	428	9	2.1	16 (3.7%)
51-60	173	5	2.9	4	127	3	2.4	4	300	8	2.7	8 (2.7%)
61-70	75	3	4.0	5	82	5	6.0	6	157	8	5.1	11 (7.0%)
71+	44	1	2.2	3	17	0	0	1	61	1	1.6	4 (6.6%)
Total	2,954	51	1.7	27 (0.9%)	1,950	25	1.3	23 (1.2%)	4,904	76	1.6	50 (1.0%)

Table 4

Showing the intensity of microfilariae in all 76 cases in 5 districts of Pattani province in 1970.

No. of microfilariae per 40 c.mm blood	Males No. pos.	Females No. pos.	Both sexes No. pos.
1-5	26	17	43 (56.6%)
6-10	14	3	17 (22.4%)
11-25	6	3	9 (11.8%)
26-50	3	1	4 (5.3%)
51-100	1	1	2 (2.6%)
101-200	1	0	1 (1.3%)
Total	51	25	76 (100%)

NARATHIWAT (Total population being about 326,000 persons in 10 districts)

Prevalence of infection: The survey for filariasis was made in 1970 in 5 districts of Narathiwat province (about 1.0% of total population), i.e. in Muang, Tak-Bai, Sungai-Padi, Sungai-Kolok and Rangae. A total of 3,287 persons of both sexes and all ages were examined for microfilariae in their blood. Ninety-three persons (2.8%) were found to harbour *B. malayi* microfilariae. The micro-

filarial rates ranged from 1.3% in Sungai-Kolok districts to 5.1% in Muang district. There were 38 cases of elephantiasis (1.2%) all in the legs, most of which were in a moderate degree. The filariasis rate was 4.0%. The results are shown in Table 5.

Age and sex distribution: The age-group and sex distribution of the 93 positive microfilaria cases are shown in Table 6. The microfilariae were found in all age-groups, the rates of which ranged from 1.8% in the

Table 5

Showing the results blood examination for *B. malayi* microfilariae and for elephantiasis in the population of 5 districts of Narathiwat province in 1970.

District	No. exam.	Mf. positive		Elephantiasis		Filariasis rate
		No.	Per cent	No.	Per cent	Per cent
Muang	971	50	5.1	15	1.5	6.7
Tak-Bai	790	17	2.2	10	1.3	3.4
Sungai-Padi	442	9	2.0	6	1.4	3.4
Sungai-Kolok	391	5	1.3	3	0.8	2.0
Rangae	693	12	1.7	4	0.6	2.3
Total	3,287	93	2.8	38	1.2	4.0

Table 6

Showing the microfilarial rates of *B. malayi* infection and elephantiasis cases in the population in 5 districts of Narathiwat province in 1970 according to age and sex distribution.

Age in years	Males				Females				Both sexes			
	No. exam.	Positive No.	%	No. with elephantiasis	No. exam.	Positive No.	%	No. with Elephantiasis	No. exam.	Positive No.	%	No. with Elephantiasis
1-10	334	7	2.1	0	294	4	1.4	0	628	11	1.8	0
11-20	488	10	2.0	0	265	5	1.9	0	753	15	2.0	0
21-30	444	20	4.5	3	170	1	0.6	0	614	21	3.4	3 (0.5%)
31-40	332	13	3.9	6	195	2	1.0	1	527	15	2.8	7 (1.3%)
41-50	237	13	5.5	10	131	4	3.1	2	368	17	4.6	12 (3.3%)
51-60	141	9	6.4	6	103	1	1.0	0	244	10	4.1	6 (2.5%)
61-70	66	3	4.5	5	46	0	0	2	112	3	2.7	7 (6.3%)
71+	25	1	4.0	3	16	0	0	0	41	1	2.4	3 (7.3%)
Total	2,067	76	3.7	33 (1.6%)	1,220	17	1.4	5 (0.4%)	3,287	93	2.8	38 (1.2%)

1-10 year group to 4.6% in the 41-50 year group. The ratio of males to females was 1:0.38 (3.7%:1.4%).

In Narathiwat, elephantiasis of legs was found in the age-group of 21-30 years or over, the rates of which ranged from 0.5% to 7.3% (Table 6). The youngest person was a man aged 21 years, while the oldest was also a man of 74 years. The ratio of males to females was 1:0.25 (1.6%:0.4%).

Intensity of microfilariae: The intensity of microfilariae in 93 positive cases was studied. The results are shown in Table 7. The mean microfilarial density among positive cases was 12.7 microfilariae per 40 c.mm blood and the mean microfilarial density of total people examined was 0.4 per 40 c.mm blood.

YALA (Total population being about 199,000 persons in 6 districts)

Prevalence of infection: The survey was

Table 7

Showing the intensity of microfilariae of *B. malayi* in all 93 cases in 5 districts of Narathiwat province in 1970.

No. of microfilariae per 40 c.mm blood	Males No. positive	Females No. positive	Both sexes No. positive
1-5	34	10	44 (47.3%)
6-10	17	2	19 (20.4%)
11-25	17	3	20 (21.5%)
26-50	7	1	8 (8.6%)
51-100	1	1	2 (2.2%)
Total	76	17	93 (100%)

made in 1970 on 2,813 persons in 5 districts of Yala province (about 1.4% of total population), i.e. in Muang, Raman, Yaha, Bannang-Sata, and Betong districts. Only one woman (0.04%) in Muang district was found to harbour *B. malayi* microfilariae and 3 men (0.11%) in Muang and Bannang-Sata districts had elephantiasis of legs. The filariasis rate was 0.15%.

RANONG (Total population being about 59,200 persons in 4 districts)

Prevalence of infection: The blood examinations were made in 1971 on 2,666 persons in 4 districts of Ranong province (about 4.5% of total population), i.e. in Muang, Kapoe, La-un and Kra-Buri districts. Only one man (0.04%) in Kra-Buri district was found to harbour microfilariae of *Wuchereria bancrofti*. He was a resident of a village situated very close to the Thai-Burmese border. Five men (0.19%) in Muang, Kapoe, and Kra-Buri districts had elephantiasis of the legs. However, all of them were the natives of Surat-Thani province (an endemic area of malayan filariasis) and migrated to settle down in Ranong in recent years.

PHANGNGA (Total population being about 135,000 persons in 8 districts)

Prevalence of infection: The blood exami-

nations were made in 1971 on 5,048 persons in 7 districts of Phangnga province (about 3.7% of total population), i.e. in Muang, Thap-Put, Takua-Thung, Thai-Muang, Ka-pong, Takua-Pa and Kuraburi districts. No one was found to harbour any kind of microfilariae. Three men (0.06%) in Takua-Pa and Kuraburi districts were found to have elephantiasis of the legs. However, they were all immigrants from Surat-Thani province.

PHUKET (Total population being about 100,000 persons in 3 districts)

Prevalence of infection: The blood examinations were made in 1971 on 5,958 persons in 3 districts of Phuket province (about 6.0% of total population), i.e. in Muang, Kathu, and Thalang districts. No microfilariae were found in any person. There were 10 cases of elephantiasis of the legs (0.17%), but all of them had emigrated from Nakhon-Si-Thammarat, Surat-Thani and Phattalung provinces in the eastern coast of the peninsula where malayan filariasis is endemic.

KRABI (Total population being about 148,000 persons in 6 districts)

Prevalence of infection: The blood examinations were made in 1971 on 4,327 persons in 4 districts of Krabi province (about 2.9% of total population) i.e. in Muang, Kaopa-

nom, Klong-Thom and Ao-Luk districts. Only one woman (0.02%) in Kaopanom district harboured *B. malayi* microfilariae, and 3 men (0.07%) in Kaopanom and Ao-Luk districts had elephantiasis of the legs. However, all of these 4 people were immigrants from Surat-Thani and Nakhon-Si-Thammarat provinces of the eastern coast of South Thailand.

TRANG (Total population being about 326,000 persons in 6 districts)

Prevalence of infection: The blood examinations were made in 1971 on 5,323 persons in 6 districts of Trang province (about 1.6% of total population), i.e. in Muang, Sikao, Huai-Yot, Kantang, Palian and Yan-Ta-Khao districts. No one showed microfilariae in the blood. Five cases of elephantiasis of the legs were noted in the districts of Sikao, Palian and Yan-Ta-Khao, but all of them had emigrated from Nakhon-Si-Thammarat where *B. malayi* infection is endemic.

SATUN (Total population being about 97,840 persons in 5 districts)

Prevalence of infection: The survey was made in 1970 on 2,446 persons in 3 districts of Satun province (about 2.5% of total population), i.e. in Muang, Langu and Thung-Wa districts. The microfilariae were not found in any person. Three cases of elephantiasis of the legs (0.12%) were residents at Muang and Thung-Wa districts, but all of them were males and were immigrants from Phattalung and Pattani provinces of the eastern coast of South Thailand.

DISCUSSION

Malayan filariasis in Thailand has its character of endemicity by localizing in canton areas widely spread out in the rural areas of the eastern provinces of the peninsula of South Thailand. The infection if regarded

for the whole province is not high, ranging from 1%-2%, while its real infection rate in a canton is up to 20%. Therefore, it is necessary to localize the real endemic focus of *B. malayi* in a particular canton before establishing a proper plan for effective control measures of this infection at low cost expenses. *Mansonia* mosquitoes of various species are the main vectors of malayan filariasis in Thailand. It has been observed that the prevalence of this infection depends upon the availability of the breeding sites of *Mansonia* mosquitoes which are usually the swampy areas along the eastern coast of the peninsula. In such areas many aquatic plants such as *Eichhornia crassipes*, *Pistia stratiotes*, *Salvinia* sp. and certain long leaf green grasses growing in the swamps including *Scirpus grossus*, *Hymenachne psuedointerrupta*, *Carex* sp., etc. act as host plants for the respiration of the larvae of *Mansonia* mosquitoes.

On the eastern coast of the peninsula there are many permanent and temporary swampy areas with various kinds of aquatic plants and long grasses which become the breeding habitats for *Mansonia* mosquitoes, while on the western coast there are no permanent swamps and *Mansonia* mosquitoes are rarely found especially in the dry season. In this respect, it may be assumed that malayan filariasis should not exist in the western coast of the peninsula of South Thailand.

The results of this survey on the prevalence of malayan filariasis in 10 provinces of South Thailand as summarised in Table 8 revealed that Pattani and Narathiwat provinces in the eastern coast of the peninsula were the endemic areas for *B. malayi* infection, while Songkhla had some filariasis cases scattered here and there in various districts, and Yala was found to be the non-endemic area of malayan filariasis. As for the western coast provinces, the survey revealed that malayan filariasis was not found in any of them. The elephantiasis cases found in those provinces were all immi-

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Table 8

Summary of the results of the survey for malayan filariasis in 10 provinces of the peninsula of South Thailand in 1970-1971.

Province	No. exam. (% of total population)	Mf. positive		Elephantiasis		Filariasis rate
		No.	%	No.	%	
Eastern Coast						
Songkhla	7,876 (1.3%)	6	0.08	20	0.25	0.33
Pattani	4,904 (2.0%)	76	1.6	50	1.0	2.6
Narathiwat	3,287 (1.0%)	93	2.8	38	1.2	4.0
Yala	2,813 (1.4%)	1	0.04	3	0.11	0.15
Total	18,880	176	0.93	111	0.59	1.52
Western Coast						
Ranong	2,666 (4.5%)	1*	0.04	5**	0.19	
Phangnga	5,048 (3.7%)	0	0	3**	0.06	
Phuket	5,958 (6.0%)	0	0	10**	0.17	
Krabi	4,327 (2.9%)	1**	0.02	3**	0.07	
Trang	5,323 (1.6%)	0	0	5**	0.09	
Satun	2,446 (2.5%)	0	0	3**	0.12	
Total	25,768	2	0.008	29	0.11	

**Wuchereria bancrofti* microfilariae were found.

**Immigrants from the provinces of the eastern coast of the peninsula of South Thailand.

grants from the endemic areas of *B. malayi* of the eastern coast of the peninsula. It is also interesting to note that a carrier of *Wuchereria bancrofti* was found in Ranong province. This man was a Thai merchant who very often travelled into many towns in Burma and thus might receive bancroftian filariasis from Burma. However, we were not able to carry out further investigation on this case.

In Pattani province, *B. malayi* infection seemed to be located mostly in 3 districts of Muang, Panare and Yaring, the filariasis rates of which ranged from 1.0% to 10.2% (Table 2). The average microfilarial positive rate was 1.6%, while the elephantiasis rate was 1.0%. The microfilarial infection rate increased with age (Table 3). It was 0.3% in the 1-10 year group, and gradually increased up to 2.6% in the 31-40 year group. In the

higher age groups the rate fluctuated, varying between 2.1% and 5.1%. The youngest person was a girl aged 5 years, while the oldest was a man aged 75 years. The males (1.7%) had a slight higher microfilarial positive rate than the females (1.3%).

The elephantiasis cases were not found in persons of less than 30 years old and they were more commonly observed in females (1.2%) than in males (0.9%).

The results in Table 4 indicated that the microfilarial counts in this area were in general rather low. Sixty cases (78.9%) had the counts of 1-10 microfilariae per 40 c.mm blood. However, the highest count of 200 per 40 c.mm blood was found in one person (male). The mean number of microfilariae per positive individual was low (11.7 microfilariae per 40 c.mm blood), and the average

microfilarial density of total people examined was 0.2 per 40 c.mm blood. All microfilariae were those of *B. malayi*.

In Narathiwat province, malayan filariasis was found to be in the same pattern as that in Pattani province. It was prevalent in 5 districts of Muang, Tak-Bai, Sungai-Padi, Sungai-Kolok and Rangae districts, the filariasis rates of which ranged from 2.0% to 6.7% (Table 5). The average microfilarial infection rate was 2.8%, while the elephantiasis rate was 1.2%. The microfilarial infection rate increased with age (Table 6). It was 1.8% in the 1-10 year age group, and gradually increased up to 4.6% in the 41-50 year group. The youngest person was a boy of 6 years residing in Sungai-Kolok district, and the oldest was a man of 80 years in Sungai-Padi district. More males (3.7%) had microfilariae in the blood than females (1.4%).

The elephantiasis cases was not found in persons of less than 20 years of age and they were more commonly observed in males (1.6%) than in females (0.4%).

The results in Table 7 indicated that the microfilarial density in the carriers in Narathiwat was rather low in general. Sixty three cases (67.7%) had the counts of 1-10 microfilariae per 40 c.mm blood. The highest count of 69 microfilariae per 40 c.mm blood was found in a man. The mean number of microfilariae per positive individual was low (12.7 microfilariae per 40 c.mm blood), and the average microfilarial density of all films was 0.4 per 40 c.mm blood. All microfilariae were those of *B. malayi*.

The prevalences of malayan filariasis in Pattani and Narathiwat provinces were tabulated with those in other provinces of the eastern coast of the peninsula which were reported formerly by various workers as shown in Table 9. Thus, it may be concluded that the endemic areas of malayan filariasis in South Thailand were found only in 6 pro-

vinces of the eastern coast of the peninsula of South Thailand.

SUMMARY

Studies on malayan filariasis were made in 1970-1971 in 4 provinces of the eastern coast of the peninsula of South Thailand, i.e. in Songkhla, Pattani, Narathiwat and Yala provinces. About 1.0-2.0% of the people in each province were examined for *B. malayi* microfilariae in their blood and for elephantiasis symptoms. The results revealed that Pattani and Narathiwat were the endemic areas of malayan filariasis, while Songkhla had a very low endemicity. Yala was found to be a non-endemic area for this infection.

In Pattani, the microfilaria positive rate was of 1.6% and the elephantiasis rate of 1.0%, thus making the filariasis rate of 2.6%. The ratio of males to females among microfilarial positive cases was 1:0.8, but among elephantiasis cases was 1:1.3.

The microfilarial density of the positive cases was rather low in general. About 78.9% of cases had the counts of 1-10 microfilariae per 40 c.mm blood. The mean microfilarial density among positive cases was 11.7 per 40 c.mm blood and that amongst the total number of persons examined was 0.2 per 40 c.mm blood. The youngest person with microfilariae in the blood was a 5-year-old girl, and the oldest was a 75-year-old man.

In Narathiwat, the microfilaria positive rate was of 2.8%, and the elephantiasis rate of 1.2%, thus making the filariasis rate of 4.0%. The ratio of males to females among microfilarial positive cases was 1 : 0.38, and among elephantiasis cases was 1 : 0.25.

The microfilarial density of the positive cases was also rather low in general. About 67.7% of cases had 1-10 microfilariae per 40 c.mm blood. The mean microfilarial density

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Table 9

Summary of the findings of malayan filariasis in 6 provinces of the eastern coast of the peninsula of South Thailand as reported formerly by various workers and in this survey.

Province	No. exam.	Mf. positive		Elephan- tiasis		Filaria- sis rate	Remarks
		No.	%	No.	%		
Chumphon	1,459 (Bangluke conton, Muang district)	158	10.8	48	3.3	14.1	Harinasuta <i>et al.</i> , 1970
	443 (Banduat canton, Lang-suan district)	22	5.0	16	3.6	8.6	Guptavanij <i>et al.</i> , 1971
Surat-Thani	977 (Village No. 2 Kanchanadit districts)	206	21.1	52	5.3	26.4	Harinasuta <i>et al.</i> , 1964
Nakhon-Si- Thammarat	9,602 (Ronphibun and Cha-uat districts)	511	5.3	229	2.4	7.7	Annual Report, Thailand, 1961(a)
Phatthalung	2,243 (Khuan-khanun district)	95	4.2	56	2.5	6.7	Annual Report Thailand 1962(b)
Pattani	2,832 (Yaring district)	163	5.8	63	2.2	8.0	Annual Report Thailand 1971 (c)
	4,904 (from this survey)	76	1.6	50	1.0	2.6	
Narathiwat	1,535 (Muang, Tak-Bai and Rangae districts)	112	7.2	61	3.9	11.3	Wongsathuythong <i>et al.</i> , 1963
	3,287 (from this survey)	93	2.8	38	1.2	4.0	

(a) = From Annual Report of the Filariasis Control Project, Ministry of Public Health of Thailand, 1961.

(b) = From Annual Report of the Filariasis Control Project, Ministry of Public Health of Thailand, 1962.

(c) = From Annual Report of the Filariasis Control Project, Ministry of Public Health of Thailand, 1971.

Note: The control of filariasis in these provinces using DEC has been carried out by the Filariasis Control Project since 1962.

among positive cases was 12.7 per 40 c.mm blood and that amongst the total persons examined was 0.4 per 40 c.mm blood. The youngest person with microfilarial in the blood was a 6-year-old boy and the oldest was a 80 year-old man.

Studies were also made in 6 provinces of the western coast of the peninsula, i.e. in Ranong, Phangnga, Phuket, Krabi, Trang

and Satun provinces. The results indicated that these provinces were not the endemic area of malayan filariasis. Some cases of elephantiasis of the legs were found, but those were the immigrants moving in from the eastern coast endemic areas of malayan filariasis.

The results of this study together with those previously reported elsewhere indicated that

the endemic areas of malayan filariasis in South Thailand were located in 6 provinces of the eastern coast of the peninsula, namely Chumphon, Surat-Thani, Nakhon-Si-Thammarat, Phatthalung, Pattani and Narathiwat, and the infection had its endemic character by localizing in particular cantons scattered here and there in the rural provincial areas.

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