Med. J. Malaysia Vol. XXXI No. 3, March, 1977

Filariasis in Perlis, Peninsular Malaysia

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INTRODUCTION

PENINSULAR MALAYSIA shares a common boundary with Thailand in the North. Health problems like vector-borne diseases in one country may affect a contiguous region. This is true of diseases like malaria and filariasis. Where control or eradication programmes are being carried out, it is necessary to ensure that these are not jeopardized by conditions in a neighbouring country. The Malaria Eradication Programme in Malaysia started in 1967 (Talib, 1973) and the Filariasis Control Programme since 1961.

Filariasis is endemic in Southern Thailand (Iyengar, 1953; Harinasuta *et al.,* 1970a) but for a pilot control programme in a village in Surathani province (Harinasuta *et al.,* 1964), no organized control work is carried out.

Perlis, the smallest (about 315 square miles), northern-most State in Peninsular Malaysia has a population of 120,991 (Malaysia, 1972). It has been sprayed twice yearly with DDT at a dosage of 2 grammes per square metre since the Malaria Eradication Programme started in 1967. Since 1974, the whole State except for the two mukims bordering Thailand entered the consolidation phase. In line with normal practice there is no regular spraying except in the buffer zone adjacent to the border with Thailand (Malaysia, 1974). No organized filariasis surveys have been carried out before in the State. However, during a malaria survey in Perlis by Sandosham *et al.,* (1963), 2 out of 108 thick blood films taken in the day in Kampong Chantek and 1 out of 166 taken at night in Kampong Titi Tinggi were positive for *Brugia malayi* infections.

As part of the study to assess the importance of filariasis at the border areas, it was decided to conduct a proper night blood and entomological survey in Perlis towards the later part of 1975.

MATERIALS AND METHODS

Eight kampongs were chosen for the survey (Figure 1). Previous to this, publicity to the survey was obtained through the local Medical Officer of Health and local village leaders. The purpose and necessity of the survey were explained and in each kampong a central point was chosen where the villagers were to meet for the blood survey. Villagers and village elders were questioned about the presence of people with elephantiasis. Signs of filariasis infection like elephantiasis and lymphoedema were asked and looked for.

20 mm^3 thick blood smears were taken from finger pricks after 1900 hours. Those six months old and above were examined. During the day the team travelled around to look for and take 60 mm^3 thick blood smears from domestic cats.

Entomological surveys were carried out during the blood surveys at each kampong. Three days were spent in each kampong where resting and bare leg catches were carried out at the place of survey and also in some of the houses. Mosquitoes caught were identified and dissected for filarial infections. Anophelines were also dissected for evidence of malarial infections.

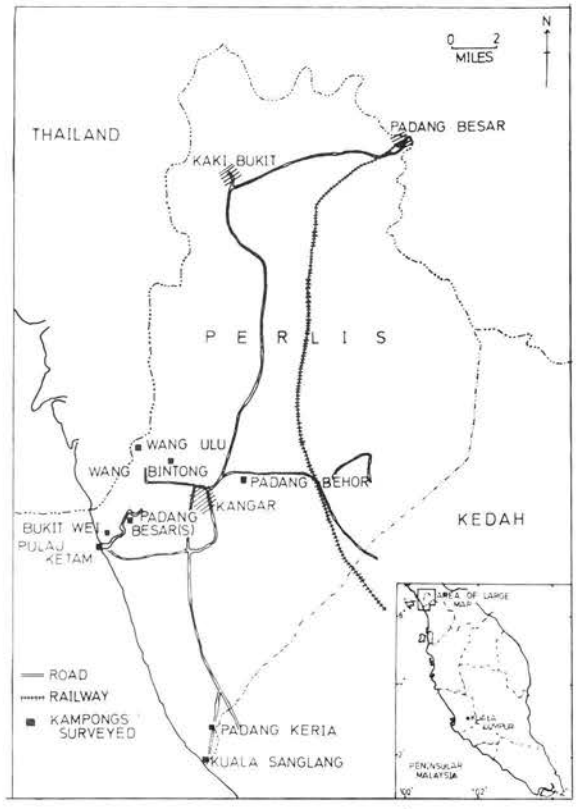

Figure 1

Location of kampongs surveyed for filariasis in Perlis, Peninsular Malaysia, 1975.

RESULTS

Parasitological Findings

A total of 858 people from 8 kampongs were examined (Table 1). Eight people were found to have periodic *Brugia malayi* microfilaremia. Of these 6 were males and 2 females. Their ages range from 17 – 40 years and the microfilarial count/ 20 mm^3 thick blood smear 1 to 32 (Table 2). These positives came from 2 kampongs, Kampong Wang Ulu with a microfilarial rate of 9.7% (7 out of 72) and Kampong Kuala Sanglang with a rate of 0.7% (1 out of 148).

In addition, 61 domestic cats from these kampongs were examined and found to be negative for microfilaraemia.

All blood films taken were negative for malaria parasites (100 fields examined in each smear at oil immersion magnification).

Clinical filariasis

A 50 year old woman in Kampong Repoh, Kangar was found to have elephantiasis below the knee in the right leg. Another 60 year old man from Kampong Padang Behor also had elephantiasis below the knee in the right leg. As far as could be determined both patients had stayed in their respective kampongs since birth and had not been travelling around. Both had elephantiasis for more than 15 years. Both patients were amicrofilaraemic.

Entomological Surveys

Entomological surveys were carried out at the same time as the blood surveys at all the 8 kampongs. In all, 1,348 specimens were collected, made up of 10 species of anophelines and at least 19 species of culicines (Table 3). Of these, 1,161 were dissected and examined for infections. Anophelines were also dissected for malaria infections as numerous anophelines were collected from both Kampong Wang Ulu and Kampong Wang Besar. The parous rate of 34.8% was very low at the time of the survey, the majority of the mosquitoes being very young and therefore unlikely to have any infection. No filarial or malarial infections were seen in the mosquitoes.

DISCUSSION

Reports of filariasis cases have been very few from Perlis and no previo s organized survey for the infection have been carried out there. In contrast, *B. malayi* infection is known to be endemic in Kedah and also in Southern Thailand. During surveys for malaria by the Institute for Medical Research, Kuala Lumpur, 1963, *B. malayi* infections were seen in Kampong Cantek and Kampong Titi Tinggi (Sandosham *et al.*, 1963). Since then no further survey has been carried out and thus the position of filariasis in the State had to be evaluated. The present survey carried out in 1975 nine years after the Malaria Eradication Programme started in Perlis has shown some interesting results.

The night blood survey among 858 people in the eight kampongs showed that although filariasis is still present in Perlis, it is at a very low level. Only two kampongs were found to have microfilaraemic patients, these being Kampong Wang Ulu with a microfilarial rate of 9.7% and Kampong Kuala Sanglang with a rate of 0.7%. The overall microfilarial rate was 0.9% (8 out of 858). The infections were due to periodic *B. malayi*. This was expected as the terrain where the kampongs were situated was typically flat rice-fields with some open swamps. The absence of any infection in 61 domestic cats from these kampongs is to be expected in this form of *B. malayi* infection.

Table 1

Results of *Brugia malayi* infections seen in 20 mm^3 peripheral thick blood smears taken at 1900 hours in Perlis, 1975

Age group (years)	Number of Persons Examined					
	Males		Females		Total	
	Positive	Negative	Positive	Negative	Positive	Negative
0 – 4	0	19	0	20	0	39
5 – 9	0	66	0	70	0	136
10 – 14	0	120	0	98	0	218
15 – 19	1	50	0	45	1	95
20 – 24	0	32	1	28	1	60
25 – 29	1	25	0	20	1	45
30 – 34	1	26	0	27	1	53
35 – 39	0	27	0	17	0	44
40 – 44	3	22	1	24	4	46
45 – 49	0	19	0	16	0	35
50 – 54	0	11	0	19	0	30
55 – 59	0	10	0	5	0	15
60 – 64	0	6	0	11	0	17
>65	0	10	0	7	0	17
Total	6	443	2	407	8	850

Table 2

Details of microfilarial carriers of periodic *Brugia malayi* detected in 20 mm^3 nocturnal, peripheral, thick blood smear examination in Perlis, 1975

Name	Age (years)	Sex	Kampong	Microfilarial count/ 20 mm.^{3} blood
M.M.	27	Male	K. Sanglang	2
A.J.A.	30	Male	Wang Ulu	1
S.B.	40	Male	Wang Ulu	12
M.H.	40	Female	Wang Ulu	21
I.D.	40	Male	Wang Ulu	1
M.A.	17	Male	Wang Ulu	32
B.I.	40	Male	Wang Ulu	5
C.S.	20	Female	Wang Ulu	2

Table 3

Mosquitoes caught in 11 nights during blood survey (resting and bare leg catches) and dissected for filarial and malarial infections, in Perlis, 1975

Mosquito species	Caught	Dissected	Parous
Anopheles (Anopheles)			
argyropus	52	48	7
campestris	6	5	2
(indiensis) nitidus	22	21	2
nigerrimus	140	121	26
peditaeniatus	99	86	12
sinensis	51	46	10
A. (Celia)			
aconitus	3	3	0
philippinensis	1	0	0
subpictus	5	4	1
vagus	4	2	1
Culex			
annulus	30	24	11
binaeniorhynchus	17	17	5
fatigans	24	23	2
gelidus	92	67	29
nigropunctatus	3	1	1
pseudovishnui	25	20	4
sinensis	4	4	1
sitiens	5	5	0
tritaeniorhynchus	113	109	50
C. (Lophoceromyia) sp.	2	0	0
Aedes			
albopictus	2	2	1
aegypti	4	4	4
amesii/fumidus	5	4	2
Mansonia			
annulifera	22	9	5
indiana	50	12	6
uniformis	559	522	220
Armigeres			
subalbatus	1	0	–
Falcabia			
luzonensis	4	1	1
sp.	3	1	1
Total	1,348	1,161	404

Only 2 cases of elephantiasis were seen and in both patients they were below the knee at the right side. Both were in old patients and had the infection for more than 15 years. The youngest microfilaraemic patient was 17 years old and the absence of the microfilaraemia in the 275 children below 10 years is encouraging (Table 1). In our inquiries among the villagers and through our observations it is also noted that elephantiasis have not been seen in the younger people.

It is interesting to note that entomological studies showed anophelines common in rice fields were still abundant in most areas except for *Anopheles campestris,* the typical house feeder and vector for both malaria and periodic *B. malayi* (Reid *et al.,* 1962). Only 6 out of 1,348 (0.4%) of the mosquitoes caught were *A. campestris. A. campestris* is probably the most endophagic and anthropophilic of all the Malayan anophelines. It is also endophilic and in a malaria eradication pilot project using residual spraying with DDT at a dosage of 2 grammes technical per square metre at 6 monthly intervals, Moorhouse and Chooi (1964) found *A. campestris* rapidly disappearing from the pilot area. The diminishing numbers of this mosquito in Perlis is therefore probably an effect of the Malaria Eradication Programme.

Mansonia mosquitoes accounted for 631 out of 1,348 (46.8%) and *M. uniformis* alone 559 out of 1,348 (41.5%) of all mosquitoes caught. 88.6% (559 out of 631) of *Mansonia* mosquitoes caught were *M. uniformis. M. annulifera* and *M. indiana* were also caught but in very few numbers these being 22 and 50 respectively. These three *Mansonia* mosquitoes together with *A. campestris* have been implicated as vectors of periodic *B. malayi,* with the latter being the more efficient (Reid *et al.,* 1962). The relative abundance of *Mansonia* mosquitoes present even after 9 years of residual DDT spraying at 6 monthly cycles is similar to the findings of Wharton *et al.,* (1958) who found that spraying with dieldrin at a dosage of 100 mgm per square foot twice yearly over 2 years had no apparent effect on the numbers of *M. dives/bonneae* caught blood fed in sprayed houses, nor the number of mosquitoes coming to bite man out of doors in the evening. In contrast Iynegar (1953) found that indoor spraying with DDT at a dosage of 1.8 grammes per square metre effectively reduced not only anophelines but also the various species of *Mansonia* 21 days post-spraying. He also showed that the infection rate among vectors dropped from 7.6% during the pre-spraying to 0% three weeks after spraying. Reid and Laing (1959) reported no significant reduction in infection rates among the human population attributable to 5 years of residual spraying with dieldrin at a heavy dosage of 100 mgm per square foot twice yearly. In our present study none of the 1,161 mosquitoes dissected showed any filarial infection. None of the 336 anophelines dissected had malarial infection.

The present as well as previous parasitological and entomological studies have shown that filariasis due to periodic *B. malayi* is present in Perlis. However, as the youngest microfilaraemic patient is 17 years old and as elephantiasis is present only in two persons who have had the infection for at least 15 years, we can postulate that active transmission is probably not occurring to any appreciable extent. This we believe, is due to the drastic reduction of *A. campestris* by the indoor spraying with DDT under the Malaria Eradication Programme in Perlis since 1967. Villagers are of the opinion that there has been a reduction in the number of nuisance mosquitoes since then. Notified cases of malaria have also dropped from 516 in 1964 and 611 in 1965 to 98, 82 and 40 in 1970, 1971 and 1972 respectively (Martinez, 1966; Talib, 1973). Although *Mansonia* mosquitoes are still present in appreciable numbers, they are probably not as important as *A. campestris* in the transmission of periodic *B. malayi.* Harinasuta *et al.,* (1970b) in a six year filariasis pilot control programme in Southern Thailand found *M. uniformis* to have some endophilic characters and DDT spraying resulted in significant decrease in the numbers of mosquitoes caught. Transmission of the disease was also thought to be reduced by the spraying. In Perlis the indoor spraying with DDT under the Malaria Eradication Programme since 1967 has a beneficial effect on filariasis control and we believe that transmission is very much reduced due to a reduction in *A. campestris* which is the more important vector of periodic *B. malayi* even though *Mansonia* sp. is still abundant.

In Kampong Wang Ulu where the microfilarial rate was 9.7%, of the 181 mosquitoes caught, 50 (27.1%) were *M. uniformis* and 1 (0.6%) *A. campestris.* It is therefore possible that transmission can take place there and mass chemotherapy with diethylcarbamazine citrate should be given.

SUMMARY

A combined parasitological and entomological survey for filariasis was carried out in Perlis in 1975. A total of 858 people and 61 cats from 8 kampongs were examined. Kampong Wang Ulu was found to have a periodic *B. malayi* infection of 9.7% (7 out of 72) and Kampong Kuala Sanglang a rate of 0.7% (1 out of 148). None of the cats was infected. Two cases of elephantiasis of the lower limbs were seen. A total of 1,348 mosquitoes were caught of which only 6 (0.4%) were *A. campestris* and 631

(46.8%) *Mansonia* sp. None of the mosquitoes were infected with filarial parasites. Transmission of filariasis has probably been reduced to a very low level due to the reduction of *A. campestris* through the spraying of DDT since 1967 under the Malaria Eradication Programme. This can be seen by the fact that the youngest microfilaraemic patient was 17 years old and no clinical cases seen in the younger population.

ACKNOWLEDGEMENTS

The authors are grateful to Dr. Ahmad Adnan, Pengarah Perkhidmatan Perubatan dan Kesihatan, Negeri Perlis and his staff for their support and cooperation during the survey. They are also grateful to the technical staff in the Divisions of Filariasis Research and Medical Entomology for aid rendered, to Mr. Yap Loy Fong, Division of Medical Ecology who screened the slides for malaria, and to the Director, Dr. George F. de Witt for his encouragement and permission to publish this article.

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