

FILARIASIS IN TAK PROVINCE, NORTHWEST THAILAND: THE PRESENCE OF SUBPERIODIC VARIANT *WUCHERERIA BANCROFTI*

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INTRODUCTION

Wuchereria bancrofti had been divided into two major morphological identical forms; a periodic type whose peak microfilaraemia occurred at approximately 0200 hours and in the Pacific islands a diurnally subperiodic type in which the microfilariae were present at all hours in the peripheral blood although there was a maximum density between 1200 and 1400 hours. The periodic type has two epidemiological settings, an urban type where the parasite was transmitted by *Culex quinquefasciatus* (*fatigans*), and a rural type whose main vector(s) are a variety of Anophe-line mosquitoes (Sasa, 1976).

Formulation of control strategies depends upon a thorough understanding of parasite biology, notably periodicity behavior which must be known for diagnostic purposes, the landscape epidemiology, and vector relationships. Harinasuta *et al.*, (1970) reported a third type of *W. bancrofti*, an Aedine-transmitted subperiodic form with a peak microfilaraemia at 2000 hours, present in the rural setting of Kanchanaburi Province. It was not only of considerable biological interest but also of importance in anti-filariasis campaign in Thailand. We became aware of a new focus of bancroftian filariasis in Tak Province, Northwestern Thailand from the Report of the Division of Filariasis, Department of Communicable Diseases Control, Ministry of Public Health in 1985. The blood survey of 1970 villagers in various Amphurs (Dis-

trict) of Tak revealed 30 (1.5%) cases of microfilaraemia, all diagnosed as being *W. bancrofti*. We have undertaken a study of the microfilarial morphology and periodicity behavior of the Tak *W. bancrofti*. We have confirmed that the microfilariae are morphologically typical of *W. bancrofti* but showed a behavioral variant in that their peak parasitaemia was found to be at 1800 hours in contrast to the 2000 hours, peak of the Kanchanaburi type.

MATERIALS AND METHODS

The names and history of five microfilaria positive individuals were obtained from the records of the Division of Filariasis, Ministry of Public Health. Three resided in Amphur Mae-Ramat and two from Amphur Pop-Pra. All five were Karens and although their permanent homes were stated to be in the respective two villages, they all have undertaken frequent and extensive travel to other Karen communities in Burma and elsewhere in Northwest Thailand.

Three 20 c.mm thick blood films were made at 2-hour intervals for 24 hours from each carrier. The number of microfilariae in the Giemsa-stained dehaemoglobinized film were counted to give an average count for 20 c.mm for each 2 hour period.

Morphometric measurements were made on a total of 36 microfilariae from one carrier at each of the Amphurs.

RESULTS

The morphometric measurements (Table 1) of the microfilariae conform to the characters typical for *W. bancrofti* (Sucharit and Harnasuta, 1981). The sheath was inconspicuous but was visible in the stained thick film in which the microfilariae were disposed in the graceful coils characteristic of *W. bancrofti* microfilariae (Figs. 1 and 2).

Table 2 and Fig. 3 show the 2-hourly microfilarial densities in the finger tip blood of four of the five carriers studied. The fifth carrier had a microfilaraemia that ranged from one at 1600 to 2000 hours and zero at other hours and was not included in the data

for microfilarial periodicity. The data from these cases showed a distinct peak at 1800 hours that was maintained about at somewhat lower density through to 2000 hours.

DISCUSSION

This study, although limited in the number of subjects examined, indicates that a nocturnally (early evening) subperiodic type of *W. bancrofti* is present in Northwestern Thailand. The practical implication of our finding is that blood surveys in this region of Thailand should be conducted between the hours of 1800-2000. The time of the day that the Division of Filariasis carried out

Table 1

Detail measurements of *W. bancrofti* microfilariae, average from 36 samples from Tak.

Measurement	Micrometers (Range)	
Body length	291.54 ± 17.02	(253.46-333.50)
Body width at:		
First nucleus	5.34 ± 1.14	(3.00-7.50)
Nerve ring	6.52 ± 1.13	(4.10-8.00)
Excretory pore	6.51 ± 1.13	(4.50-8.40)
Anterior Innenkörper	6.21 ± 1.12	(4.50-8.00)
Posterior Innenkörper	5.97 ± 0.99	(4.00-8.00)
Anal pore	5.68 ± 1.16	(3.00-7.50)
Cephalic space:		
Length	4.62 ± 0.80	(3.00-7.00)
Length : width	0.89 ± 0.17	(0.52-1.40) : 1
Head to:		
Nerve ring	56.72 ± 7.43	(43.36-88.71)
Excretory pore	87.26 ± 13.13	(70.04-153.41)
Anterior Innenkörper	148.44 ± 18.28	(116.73-206.77)
Posterior Innenkörper	189.64 ± 22.92	(153.75-250.13)
Anal pore	241.42 ± 18.53	(210.11-274.80)
Last nucleus	283.31 ± 17.22	(254.79-323.50)

Table 2

Counts of microfilariae of *W. bancrofti* in 4 carriers and the counts expressed as percentages of the peak counts. (in brackets), taken at 2-hour intervals over a period of 24 hours.

Carrier No.	Age	Microfilariae/20 c.mm blood* taken at hours											
		1200	1400	1600	1800	2000	2200	2400	0200	0400	0600	0800	1000
1	20	8(26)	11(35)	10(32)	27(87)	31(100)	28(90)	27(87)	6(19)	10(32)	9(29)	5(16)	2(6)
2	48	2(14)	5(36)	1(7)	14(100)	11(79)	5(36)	4(29)	2(14)	4(29)	2(14)	1(7)	3(21)
3	28	9(22)	3(7)	3(7)	41(100)	28(68)	24(59)	11(27)	18(44)	3(7)	8(20)	2(3)	8(20)
4	8	18(20)	8(9)	13(14)	90(100)	36(40)	31(34)	14(16)	13(14)	5(6)	6(7)	3(3)	6(7)
Average		20.5%	21.8%	15.0%	96.8%	71.8%	54.8%	39.8%	22.8%	18.5%	17.5%	7.3%	13.5%

*Average of counts on three samples.

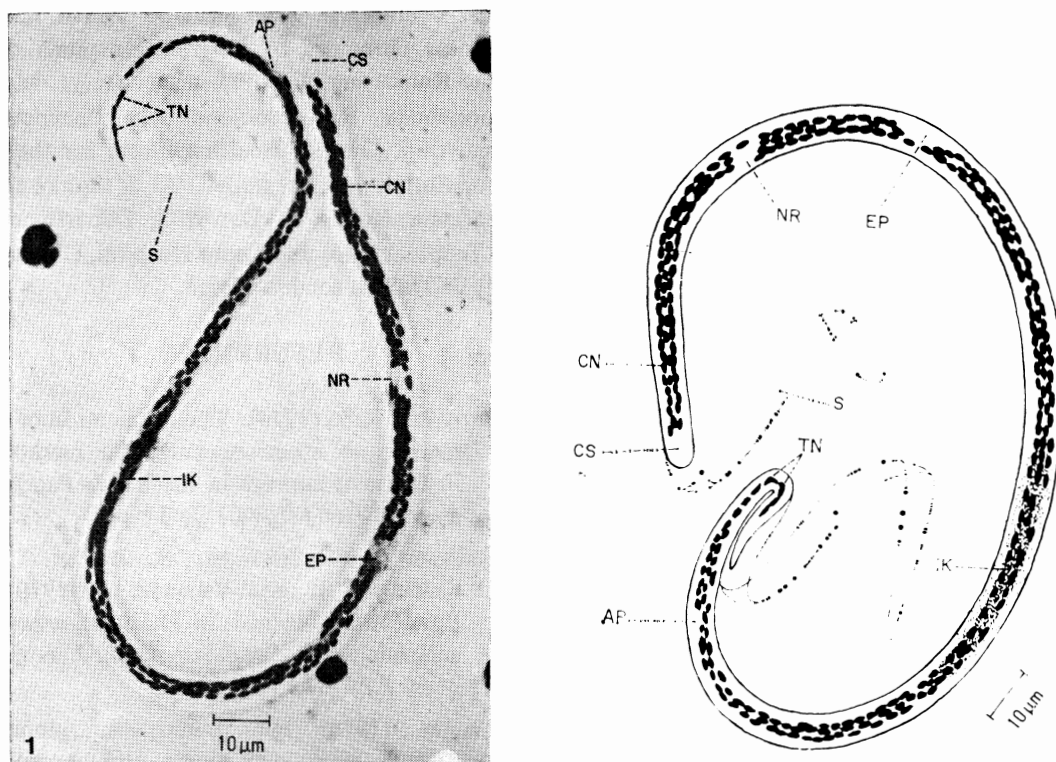


Fig. 1, 2—*W.bancrofti* microfilaria from a carrier residing at Amphur Mae-Ramat, Tak Province, Northwestern Thailand; 1, microfilaria stained with Giemsa showing short cephalic space (CS), distinct column nuclei (CN), nerve ring (NR), excretory pore (EP), Innenkorper (IK), anal pore (AP), single row of terminal tail nuclei (TN), and inconspicuous staining slender sheath (s), 2, a schematic drawing of a microfilaria of *W.bancrofti*.

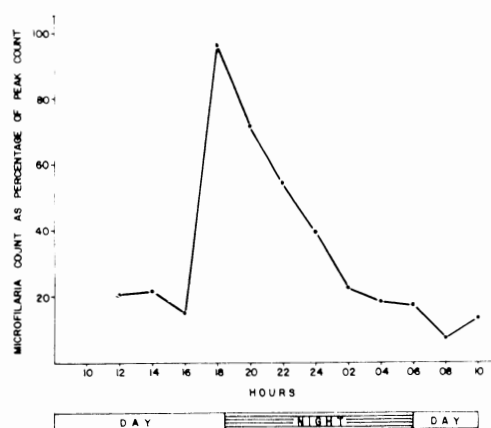


Fig. 3—Showing the periodicity of *W.bancrofti* microfilariae in Amphur Mae-Ramat and Amphur Pob-Pra, Tak Province, Northwestern Thailand (based on 4 cases).

their surveys was not stated in their report. If, however they carried out their investigation at the conventional time for nocturnally periodic bancroftian filariasis between 2200 and 0200 hours then the possibility exists that a number of low density carriers would not have been parasitologically diagnosed. In the light of our findings it would, therefore, be of value to carry out sample resurveys, with a subsample on which a concentration technique (Desowitz, 1974) is performed at the time indicated above in order to obtain more accurate prevalence rate.

A variant of *W. bancrofti* whose microfilariae have a peak peripheral blood density between 1800 and 2000 hours would proba-

bly have a crepuscular-biting mosquito as its vector. The Division of Filariasis noted in their report that some of the *Aedes harinasutai* collected in the area were found with L₃ larvae, assumed to be of *W. bancrofti*. Further vector studies of *W. bancrofti* at Tak Province are required.

SUMMARY

The microfilariae found in carriers at Tak Province, Northwestern Thailand were morphologically and morphometrically studied. It was found that the parasites conformed to that of *W. bancrofti* microfilaria.

The microfilarial periodicity as determined from four carriers was found to be nocturnally (early evening) subperiodic type showing a distinct peak at 1800 hours.

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