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Author(s)	Takagi, Masahiro
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## Database Analysis on Malaria and Its Vectors in Northern Thailand

Masahiro TAKAGI

*Institute of Tropical Medicine, Nagasaki University, Nagasaki, Japan*

Reformatting, computing and analysis of all available data of malaria concerned in northern Thailand have started to evaluate a long-term change in malaria and its vector situation, and to avoid missing and scattering valuable information in malaria epidemiological surveys and studies which were carried out by Office of Vector Borne Diseases Control 2 (previous Malaria Center 2) with collaborators in the past days. Firstly all readable stocked data at provincial, district and country malaria offices were photocopied, examined qualities, and decided the format for the original electric database, which was composed of 5 items (general back ground, vector control measurement, environmental conditions, malaria incidence and vector abundance) of 34 parameters. It was found that a total of 4061 surveys had been completed for 30 years since 1968 in 13 provinces with more than 400 surveys in 7 provinces. Problems for analysis are: that about 20% of the data lacks key parameters such as the number of human baits and so on, that data before 1968 are too weak to analyze, and that the surveys had mainly been focused to problem areas, period, and recent 10 years. Nevertheless, a rough analysis based on 436 data sets of Maehongson Province, where malaria has been being serious, revealed clear temporal changes in vector and malaria situation suggesting recent natural and social environmental changes in the province (Table 1, 2). We also have conducted a regular monitoring on vector occurrence and vegetation at several villages with different malaria endemicity to realize key environmental factors affecting malaria epidemiology. We believe the completion of this database and analysis is helpful to yield more reasonable and harmonious malaria control strategy under unstable environment with radical developing.

**Table 1.** Order of anopheline abundance until 1987 and thereafter (until 1998) in Maehongson Province, northern Thailand

<i>An.species</i>	-1987	<i>An.species</i>	-1998
<i>annularis</i>	43.81	<i>minimus</i>	30.91
<b><i>maculatus</i></b>	<b>28.46</b>	<b><i>maculatus</i></b>	<b>29.62</b>
<i>maculatus</i>	23.28	<i>maculatus</i>	14.40
<i>sawadwongporni</i>	4.84	<i>sawadwongporni</i>	7.90
<i>pseudowillmori</i>	0.20	<i>pseudowillmori</i>	0.47
<i>dravidicus</i>	0.07	<i>dravidicus</i>	1.37
<i>willmori</i>	0.07	<i>willmori</i>	5.48
<b><i>minimus</i></b>	<b>20.19</b>	<i>vagus</i>	21.46
<i>aconitus</i>	15.84	<i>annularis</i>	18.57
<i>philippinensis</i>	10.50	<i>barbirostris</i>	16.82
<i>vagus</i>	7.18	<i>kochi</i>	15.41
<i>nivipes</i>	6.74	<i>aconitus</i>	14.93
<i>kochi</i>	3.72	<i>hyrcanus</i>	12.82
		<i>peditaeniatus</i>	1.05
		<i>sinensis</i>	0.03
		others	11.74
<i>hyrcanus</i>	4.04	<i>nivipes</i>	2.31
<i>peditaeniatus</i>	0.29		
<i>sinensis</i>	0.12	<i>splendidus</i>	2.29
others	3.63	<i>culicifacies</i>	1.68
<i>culicifacies</i>	0.80	<i>dlrus</i>	1.19
<i>barbirostris</i>	0.52	<i>tessellatus</i>	0.68
<i>splendidus</i>	0.50	<i>stephensi</i>	0.15
<b><i>dlrus</i></b>	<b>0.50</b>	<i>varuna</i>	0.14
<i>tessellatus</i>	0.48	<i>jeyporiensis</i>	0.14
<i>varuna</i>	0.44	<i>jamesi</i>	0.09
<i>sp.A</i>	0.14	<i>pseudojemesi</i>	0.06
<i>stephensi</i>	0.12	<i>campestris</i>	0.05
<i>campestris</i>	0.03	<i>philippinensis</i>	0.04
<i>jeyporiensis</i>	0.02	<i>sp.A</i>	0.01
<i>jamesi</i>	0.01		
<i>pseudojemesi</i>	0.00		
<b>total</b>	<b>143.82</b>	<b>total</b>	<b>169.04</b>

Table 2. Major malaria vector density (no./bait/night) until 1987 and thereafter (until 1998) in Maehongson Province, northern Thailand

Species	Buffalo bait (outdoor) -1987 (A)	Human bait (outdoor) -1987 (B)	Human bait (indoor) -1987 (C)	Total -1987 (D)	Buffalo bait (outdoor) -1998 (a)	Human bait (outdoor) -1998 (b)	Human bait (indoor) -1998 (c)	Total -1998 (d)
<i>An. minimus</i>	4.87	13.25	2.07	20.19	6.97	14.93	9.01	30.91
<i>An. dirus</i>	0.01	0.47	0.02	0.50	0.05	0.66	0.48	1.19
<i>An. maculatus</i>	14.84	13.01	0.61	28.46	13.26	13.87	2.49	29.62
<i>An. aconitus</i>	7.10	7.85	0.89	15.84	11.04	3.15	0.74	14.93
<i>An. annularis</i>	18.36	21.79	3.66	43.81	13.49	3.65	1.43	18.57
Total	68.07	66.16	9.60	143.82	109.41	43.85	15.78	169.04

Species	A/D	B/D	C/D	C/(B+C)	a/d	b/d	c/d	c/(b+c)
<i>An. minimus</i>	0.241	0.656	0.103	0.135	0.225	0.483	0.291	0.376
<i>An. dirus</i>	0.020	0.940	0.040	0.041	0.042	0.555	0.403	0.421
<i>An. maculatus</i>	0.521	0.457	0.021	0.045	0.448	0.468	0.084	0.152
<i>An. aconitus</i>	0.448	0.496	0.056	0.102	0.739	0.211	0.050	0.190
<i>An. annularis</i>	0.419	0.497	0.084	0.144	0.726	0.197	0.077	0.281
Total	0.473	0.460	0.067	0.127	0.647	0.259	0.093	0.265