

Ecology of Japanese Encephalitis Vectors

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OBJECTIVES: To determine the identity of mosquitoes involved in the transmission of JE virus in the Chiangmai area and to measure the seasonal density, host preferences, insecticide susceptibility status and flight dispersal characteristics of suspected vector species.

DESCRIPTION: Between June and September 1969 an epidemic of encephalitis due to JE virus occurred in Chiangmai and other northern provinces of Thailand. In collaboration with the Epidemiology and Virology Departments of SMRL an initial survey of the affected districts in Chiangmai province was made in July, and approximately 11,000 culicine mosquitoes were collected for virus isolation attempts. In October 1969 routine collections of adult and larval mosquitoes were begun in seven districts of Chiangmai province. In order to measure mosquito population densities and to provide material for virus isolation attempts, 10 New Jersey type and 16 CDC (battery-powered) type light traps are operated weekly at sites in Mae Rim, San Sai, Doi Saket, Saraphi, Muang, Sankampaeng and Sanpatong districts. Bi-monthly larval surveys of culicine mosquitoes are made to determine population densities, types and location of breeding sites in the study sites.

PROGRESS: Between October 1969 and April 1970, 31,431 mosquitoes, consisting primarily of Culex fuscocephala, C. gelidus, C. tritaeniorhynchus, C. vishnui complex, Aedes lineatopennis, A. mediolineatus and A. vexans, were collected for virus isolation attempts. Results of isolation attempts are given in the report of Virology Department. As measured by light trap collections of female mosquitoes, populations of the two suspected vector species, C. gelidus and C. tritaeniorhynchus, declined in December and remained at a low level until March. The numbers of C. tritaeniorhynchus began to rise in March, but there was little change in the C. gelidus population (Fig. 1).

During November 1969 and March 1970 houses in the study sites in Saraphi, Sankampaeng, Sanpatong, Mae Rim and Muang districts were surveyed for the presence of Aedes aegypti. The results of these surveys indicated that the A. aegypti population densities varied greatly between study sites; villages in Sanpatong district had no A. aegypti while in the Muang district (Chiangmai city) at least 50% of the houses were infested (Table 1). The A. aegypti indices represent the proportion of houses visited in which larvae of that species were found. These indices showed a strong positive correlation with the data for dengue prevalence in these areas (See report of Epidemiology Department).

The stomach contents of blood engorged mosquitoes collected in light-traps in the Chiangmai area were tested by the agar-gel diffusion test to determine sources of their blood meals. The majority of those tested had fed on cattle and/or buffalo, while smaller numbers had pig, horse, chicken and humans (in that order) blood in their guts (Table 2).

Table 1. Results of survey of houses in Chiangmai study sites for presence of Aedes aegypti—1969–70.

Site	November 1969		March 1970	
	No. Houses inspected	<u>Aedes aegypti</u> index	No. Houses inspected	<u>Aedes aegypti</u> index
Amphur Mae Rim	52	.02	82	.00
Amphur Muang	128	.68	144	.58
Amphur Sankampaeng	92	.29	72	.39
Amphur Sanpatong	103	.00	93	.00
Amphur Saraphi	64	.16	78	.12

Table 2. Blood meal sources of mosquitoes identified by agar-diffusion technique—Chiangmai, October–November 1969.

Species	Host				
	Human	Buffalo—Cow	Pig	Horse	Chicken
<u>Culex fuscocephala</u>	0	169	8	3	0
<u>Culex gelidus</u>	0	69	3	0	0
<u>Culex tritaeniorhynchus</u>	0	190	2	0	1
<u>Culex vishnui</u> complex	3	222	5	3	9

