

SURVEY OF THE PHIBUNPRACHASAN SCHOOL FOR *Aedes aegypti*
BREEDING SITES AND FOR DENGUE VIRUS
INFECTED ADULT FEMALES

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PURPOSE : To assess the possibility that dengue virus infections are being transmitted to students by *Aedes aegypti* on the grounds of the Phibunprachasan School.

BACKGROUND : A longitudinal study of dengue virus infections has been conducted by AFRIMS at the Phibunprachasan School in the Din Daeng area of Bangkok since 1977. During the 1977 epidemic of dengue virus infections in Bangkok, children in Prathom 6 were found to have a higher infection rate than those in other grades. (See Annual Report, AFRIMS 1977-1978, pp. 96-108). As each grade level is housed in a separate building at the school, these data could be interpreted as evidence for virus transmission within the class room. We therefore sought to define the density of the vector mosquito species on the school grounds, and attempted to isolate dengue viruses from adult female *Ae. aegypti* captured on the school grounds.

METHODS : Assessment of the vector status for dengue virus transmission at the Phibun School grounds was done in three parts during the peak of the 1980 dengue epidemic.

Larvae survey : On August 28 and 29, 1980, the availability and utilization of *Ae. aegypti* immature habitats were evaluated by the same survey team which had been conducting periodic surveys in the Din Daeng area across the road (See Annual Report AFRIMS 1978-1979, pp. 73-112), using definitions and methods employed in that study. Each artificial container was researched thoroughly for larvae and pupae, and all immature mosquitoes were brought to the laboratory for identification and counting. All 25 buildings on the school grounds were surveyed, and the location (inside or outside) and type of all artificial containers with water was recorded. No standardized jars or traps were used in this study.

Biting collections : On two successive weekends (August 30-31, and September 6-7, 1980) biting collections were carried out at the school between 0800 and 1100 hrs. A total of approximately 32 man-hours were devoted to biting collections.

Laboratory studies to detect dengue viruses in captured adult females : All adult females *Ae. aegypti* captured alive during biting collections were brought back to the laboratory and frozen. Head squash preparations of the mosquitoes were examined by direct fluorescent antibody staining for dengue antigens. Thorax-abdomen suspensions were each inoculated intra-thoracically into 5 *Toxorhynchites splendens* mosquitoes by AFRIMS standard laboratory procedures to detect dengue viruses.

RESULTS : On the grounds of the Phibunprachasan School there are two basic types of structure : (1) buildings occupied predominantly by students during school hours, including classrooms, eating rooms, and bathrooms and (2) buildings occupied predominantly by the school staff and their families as permanent dwellings, most of which line the northeast perimeter of the school grounds. As there were major differences in the density of breeding sites and adult female capture rates between the two types of structures, the results will be broken down accordingly.

Immature survey : A total of 589 artificial containers suitable for immatures of *Ae. aegypti* were found; 446 of these containers (76%) contained standing water and 113 (19%) contained immature *Ae. aegypti*. More total containers were found inside buildings (401) than outside (118), and overall more containers with immature *Ae. aegypti* were found inside (71) than outside (42). More positive containers were found in staff residences (79) than in student buildings (34) and the percentage of containers positive for immature larvae was higher in staff residences (79/226, 35%) than in student buildings (34/363, 9%). Table I shows the type of containers found in each building. Most of the positive containers in the student buildings were vases (27/34, 79%) while the commonest positive containers in the staff residences were water jars (33/79, 42%) and ant traps (22/79, 28%). Most positive containers in the staff residences were found in one long multi-family unit dwelling, (coded as building I in the table). Overall 2287 larvae and pupae were collected in the staff residence, while 380 were collected in the student buildings.

Laboratory assays : No evidence of dengue virus infection was detected in any of the 49 adult female *Ae. aegypti* captured and assayed. (Table II).

The overall results are summarized in Table III. Although the staff quarters represented only a small fraction of the total building square footage on the school grounds, the number of *Ae. aegypti* breeding sites, the larvae density, and the adult density were much higher in these buildings than in the classrooms. The overall vector threat at the school could be significantly reduced by regular water changes in the ant traps and water jars in the staff quarters and vases in the student buildings.

Table 1. Types of positive containers found during surveys at the Phibunprachasan School (# total each type/# positive for *Ae. aegypti* larvae each type)

Student Buildings	Type of Container						
	Tire	Water Jar	Foot Bath	Ant Trap	Vase	Bath Tank	Other
A	1/1	1/1	3/1	8/0			
B	10/0	3/0			6/1		
P		2/0			4/0		
R		2/0	3/0		15/2		
S		4/0			38/5		6/0
T		1/0	6/0		23/1		
U		10/0		4/0	86/10		9/0
V		3/1					
W	8/0	6/0					
X		3/3			42/7		
Y		1/0			12/1		
Z		1/0			10/0		20/0
AA							
Totals	19/1	37/5	12/1	12/0	248/27	0/0	35/0
Staff Buildings							
C							2/0
P	2/1	2/0		8/0			
E		2/0					
F		1/0					
G					6/0		1/1
H	1/0						
I	1/1	64/26	4/1	24/11	16/1		13/8
J		2/1		4/2		1/0	1/0
K		8/1		12/4		1/0	
L		3/3		4/0		1/1	
M	2/2	6/2		1/1	18/5		2/2
N	1/1	5/0		4/4	1/0	1/0	1/0
Totals	7/5	93/33	4/1	57/22	41/6	4/1	20/11

Table 2. Adult females captured/per man-hour in biting collections

Date	Student Buildings			Staff Residences		
	# aegypti	Hours collected	aegypti/ man-hour	# aegypti	Hours collected	aegypti/ man-hour
30 Aug 80	3	6	0.5	25	2	12.5
31 Aug	1	8	0.1	ND	ND	-
6 Sep	0	8	0.0	ND	ND	-
7 Sep	ND	ND	-	20	8	2.5
Total	4	22	0.2	45	10	4.5

Table 3. Summary of *Aedes aegypti* survey at Phibunprachasan School,
August 28 - September 7, 1980

	<u>Student Buildings</u>	<u>Staff Buildings</u>
Total containers	363	226
Total containers with standing water	247	199
Total containers with larvae	34	79
Total larvae/pupae collected	380	2287
Total adult females captured	4	45
Adult females captured/man-hour of biting collection	0.2	4.5
Dengue virus isolations from adult females	0	0