

## BODY OF REPORT

SEATO Medic Study No. 9 Ecology of Arboviruses in Thailand. Avian and Mammalian Reservoirs of Arboviruses in Thailand.

Project No. 3A 025601 A 811 Military Medical Research Program  
S. E. Asia

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Reporting Installation: US Army-SEATO Medical Research Laboratory  
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Division of Medical Research Laboratories

Department of Virology

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Objective: To determine the role of mammals and birds as amplifying hosts in the natural cycle of arthropod borne viruses in Thailand.

Description: Repeated serum samples are obtained from avian and mammalian species at frequent intervals during various seasons of the year and from various geographical and ecological habitats in Thailand. Where possible sera are stored for virus recovery. Sera are tested by various serologic methods against Thailand virus isolates and prototype viruses recovered in Southeast Asia and other areas of the world.

Progress: Chikungunya virus may be one of a group of arthropod borne viruses (fortunately rare) with a zoonotic cycle and also the ability to cause large urban epidemics. This ability appears to be due to its efficient transmission by the anthropophilic urban species, Aedes aegypti. In Africa, evidence that chikun-

Table 1  
 INCIDENCE OF CHIKUNGUNYA HI ANTIBODY SERA OF SELECTED MAMMALS  
 RESIDENT NEAR BANGKOK, 1962

Animals	No. with HI antibody/No. tested
Calf	8/170
Cattle	1/36
Water buffalo	16/71
Horse	60/106
Pig	82/269
Dog	4/103
Cat	0/17
Monkey	3/59
Rabbit	1/19
Bats	2/86
<u>Mus musculus</u>	0/17
<u>Rattus rattus</u>	0/21
<u>Rattus norvegicus</u>	0/38
Musk shrew	0/10

gunya has a transmission cycle other than man to mosquito to man has been presented by several workers who have demonstrated viremia in monkeys and neutralizing antibody in chimpanzees and other primates. However, in South African studies, 5 species of wild birds, chickens, cattle, sheep, goats and horses did not develop viremia when inoculated with live virus subcutaneously.

The situation in Thailand is somewhat different. Serologic studies of a large series of sera from domestic animals are shown in Table 1. The animals sampled were reared in the Central and the Southeast coastal regions of Thailand. Selected HI positive and negative sera were retested by virus dilution neutralization tests in hamster kidney cells. The correspondence of test results was 95%. Only a few sera from approximately 3500 birds captured in 1962 and 1964 (SEATO Medic Study No. 13) contained chikungunya HI antibody. These sera have not yet been tested for neutralizing antibody.

Further evidence of a zoonotic cycle for chikungunya has been provided by the recovery of 1 strain of this virus from Culex tritaeniorhynchus captured at the Red Cross Horse Farm, Bangphra, Thailand. This institution located 60 miles southeast of Bangkok is sparsely settled by humans. The farm stables approximately 120 horses and is located on moderately hilly terrain surrounded by tapioca plantations. The area has only recently come under cultivation. Chikungunya virus was recovered from a pool of 200 Culex tritaeniorhynchus captured in November 1962.

Neutralizing antibodies to chikungunya virus have been found in human sera from all areas of Thailand and from Rangoon, Burma, Saigon and the Mekong Delta, South Vietnam and Vientiane, Laos. While chikungunya virus has never been recovered from Malaysia, it has been isolated in South Thailand in a town only 160 kilometers north of the Malaysia border. Tribal groups living at 2,000 feet or more above sea level in North Thailand. Central Laos and or the the Central Highlands of South Vietnam have had very little or no evidence of chikungunya infection (SEATO Medic Study No. 5).

It is not known whether chikungunya virus is endemically maintained in Bangkok metropolitan population or in a zoonotic cycle. Evidence of infection in large domestic mammals is such that it appears likely that the virus could be maintained enzootically at least in Central Thailand. Further studies will be required to determine whether the human and zoonotic cycles are independent or, if not, which cycle contributes virus to which.

Summary and Conclusions: Large domestic mammals, especially the pig, water buffalo and horse have been found to be frequently positive for chikungunya HI and neutralizing antibody. This virus has been recovered from Culex tritaeniorhynchus in an area where human population was small. It is proposed that chikungunya virus may be maintained in a zoonotic cycle with introduction of virus from such "sylvan" cycle to the urban Aedes aegypti-man cycle.