# Comparison of Susceptibility to *Brugia malayi* between strains of *Aedes togoi* Originated from Thailand and Japan

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**Abstract:** The susceptibilities to *Brugia malayi* (periodic form, Che-ju strain) of *Aedes togoi* of Chantaburi, Thailand, and Nagasaki, Japan, were compared. No significant differences were observed between these two strains in the number of microfilariae in the mosquito just after feeding on a jird infected with *B. malayi* and in the number of infective larvae 14 days after blood feeding. Most of the microfilariae of *B. Malayi* taken up by the mosquito developed successfully to infective larvae in Chantaburi strain as well as in Nagasaki strain. These results indicated that no difference in the susceptibilty to *B. malayi* was recognized between Chantaburi and Nagasaki strains of *Ae. togoi*.

*Key words*: *Aedes togoi*, *Brugia malayi*, Susceptibility, Thailand, Japan.

## INTRODUCTION

Sasa (1976) divided the nocturnally periodic form of *Brugia malayi* into two groups. One is transmitted by the mosquitoes of *Mansonia* and *Anopheles* in Thailand and West Malaysia, and another by *Aedes togoi* in Hachijo-Koshima, Japan, in Che-ju, Korea, and in Choushan Islands, China,

Recently, *Ae. togoi* has been collected from east cost of West Malaysia. Taking an interest in the problem whether *Ae. togoi* is concerned with the prevalence of *B. malayi* in that area, Lim *et al.* (1980) and Ramalingam (1969) examined the susceptibility of *Ae. togoi* from West Malaysia to *B. malayi*. They showed that Malaysian and Taiwan strain

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of *Ae. togoi* were equally sensitive to the nocturnally subperiodic from of *B. malayi*.

In southern Thailand, the nocturnally periodic and subperiodic forms of *B. malayi* are distributed by mixture (Guptavanij and Harinasuta, 1971; Iyengar, 1953), and *Ae. togoi* was collected from the same area (Gould *et al.*, 1968). According to Ramalingam (1969), SEATO Laboratory also cellected *Ae. togoi* from coastal areas in Thailand. Choochote et al. (1983) showed the *Ae. togoi* originated from Thailand could be used as a vector of subperiodic *B. malgyi* in the laboratory experiment, but by the field survey in southern Thailand (Guptavanij *et al.*, 1971; Iyengar, 1953) larvae of *B. malayi* were found in the mosquitoes of *Mansonia* and *Anopheles*. In the present paper, to consider the possible role of *Ae. togoi* in the transmission of periodic *B. malayi* in Thailand, the susceptibility to *B. malayi* of *Ae. togoi* originated from Thailand was examined and compared with that of *Ae. togoi* originated from Japan.

## MATERIALS AND METHODS

The colony of Chantaburi strain of *Ae. togoi* was established in 1982 from larvae collected by the authors at rock pools by the sea in a small island in Laem Sing, Chantaburi, Thailand. This colony has been maintained at 25°C and 80% RH under 16 hr daylength without blood meals. For the present experiment, the third generation was used. The Nagasaki strain of *Ae. togoi* was originated from larvae collected at rock pools by the sea in Tameshi, Nagasaki, Japan and kept in the same condition as the Chantaburi strain for 70 generations with mouse blood.

The original source of *B. malayi* was infective larvae in *Ae. togoi* collected at Cheju, Korea in 1971 (see Nakajima *et al.*, 1976). A cat was infected with these infective larvae, and thereafter the strain of *B. malayi* has been maintained in cats and jirds, *Meriones unguiculatus*, using *Ae. aegypti* (Liverpool strain) at the vector.

One hundred first instar larvae of *Ae. togoi* of each strain were reared at 25°C and 80% RH in an enamel pan (22×28 cm) with about 1,500ml of water. Water suspension of 0.2g of equally mixed powder of Brewer's yeast and mouse pellets was added to a larval pan every day. Pupae were picked up and placed in cups with water for emergence. The resulting adults were provided with maintenance diet of 2% sugar soution.

Ten days old females of Chantaburi strain, which had oviposited without blood, were fed for 30 minutes on an infected jird with *B. malayi* microfilaremiae of *ca.* 5/mm$^3$ in the peripheral blood, and then 7 days old Nagasaki strain females were fed on the same jird. The numbers of microfilariae of *B. malayi* taken up by fed females of both strains were counted just after feeding, and 14 days later surviving females were dissected to count the number of the third stage infective larvae of *B. malayi*.

## RESULTS

The mean number of microfilariae in the midgut of females just after feeding on the infected jird and the mean number of infective larvae in the whole body of mosqitoes 14 days later are given in Table 1. The mean number of microfilariae in Chantaburi st-

Table 1. Susceptibility of *Aedes togoi* originated from Chantaburi, Thailand, and from Nagasaki, Japan, to *Brugia malayi* of Che-ju (Korea) strain

| Strain | No. of microfilariae taken up* | | No. of infective larvae 14 days after feeding** | |
|---|---|---|---|---|
| | Mean | Range) | Mean | (Range) |
| Chantaburi | 2.36[a] | (1-11) | 2.86[b] | (1-12) |
| Nagasaki | 2.92[a] | (1-10) | 2.53[b] | (1-18) |

* Fed on blood of jird with *ca.* 5 /mm$^3$ microfilaremiae.
** Reared at 25 C, 80% RH, 16 hr dayeylength.
a, b Values followod by the same letter are not significantly different at the 5% level (t-test).

rain was 2.36 and that of Nagasaki strain was 3.08. These two values were not significantly different (P: 0.5−0.3). The mean numbers of infective larvae were 2.86 in Chantaburi strain and 2.53 in Nagasaki strain, which were again not significantly different (P: 0.5−0.3). Since any obvious difference was not recognized between the mean numbers of microfilariae and infective larvae in both strains, most of microfilariae seem to develop successfully to the third stage, when fed on the jird with microfilarial density as low as 5/mm$^3$ of blood. In fact, only one larvae at the second stage was found dead in Chantaburi strain 14 days after feeding.

## DISCUSSION

Choochote *et al.* (1983) noted that Chantaburi strain of *Ae. togoi*, which was shared from our colony, could be used as a vector of nocturnally subperiodic form of *B. malayi* in the laboratory experiment, because *B. malayi* developed in this strain of *Ae. togoi* as well as in *Mansonia uniformis*, a natural vector in Thailand, or in Taiwan strain of *Ae. togoi*. In the present experiment, it was confirmed that the susceptibility of Chantaburi strain *Ae. togoi* to nocturnally periodic *B. malayi* was not different remarkably from that of Nagasaki strain. *Ae. togoi* originated from Nagasaki, was shown to be susceptible not only to nocturnally periodic form of Che-ju strain *B. malayi*, but also Malaysian nocturnally subperiodic form (Maeda and Kurihara, 1980; Nakajima *et al.*, 1976). Kobayashi *et al.* (1981) also showed that another Japanese strain of *Ae. togoi* was susceptible to Che-ju strain *B. malayi*. The susceptibility of *Ae. togoi* of Taiwan strain and of Malay-

sian strain to *B. malayi* of Malaysian origin was already reported (Laurence, 1964; Lim *et al.*, 1980). From these results, *Ae. togoi* originated from any place could be a vector of both forms of *B. malayi*. Although the larvae of *B. malayi* have never been found from *Ae. togoi* in the field in Thailand, this mosquito has the susceptibility to transmit *B. malayi* whan it feeds on the carrier of microfilariae in the field.

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タイ国と日本のトウゴウヤブカのマレー糸状虫に対する感受性の比較

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タイ国チャンタブリ系と長崎系のトウゴウヤブカの済州島系マレー系状虫に対する感受性の比較を行った．これら二つの系統の間に，マレー系状虫感染のスナネズミを吸血した場合の吸血直後のミクロフィラリア取り込み数，および吸血14日後の感染幼虫数の差はみられなかった．チャンタブリ系のトウゴウヤブカでもほとんどのマレー糸状虫の幼虫は，長崎系のトウゴウヤブカでみられるのと同じように正常に発育した．これらの結果はチャンタブリ系と長崎系のトウゴウヤブカの間に，夜間定期出現性である済州島系マレー糸状虫に対する感受性の差はないことを示している．

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