

STUDIES ON MALAYAN FILARIASIS IN CHE-JU ISLAND, KOREA

2 Vector Mosquitoes of Malayan Filariasis

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Received for publication 31 October 1973

Abstract: Although 14 species of mosquitoes were collected in Che-ju Island, Korea in August and September, 1970-1972, dominant mosquitoes feeding on man around dwelling houses were *Culex pipiens pallens* and *Aedes togoi*. Natural infections with infective larvae of *Brugia malayi* were demonstrated only in *Ae. togoi*. It is considered from these facts that the main vector of malayan filariasis in Che-ju Island is *Ae. togoi*. *Anopheles sinensis* which is known as the vector of malayan filariasis in other areas does not seem to act an important role in the transmission in Che-ju Island, because the density is very low owing to the scarcity of suitable breeding places. The period for the larvae of *Brugia malayi* to mature in *Ae. togoi* was estimated to be between 6 and 9 days from the results obtained by dissecting the females of the mosquito reared in the laboratory for various days after the collection at houses with microfilarial carriers. This period is much shorter than in the case of *Wuchereria bancrofti*. The breeding of *Ae. togoi* was observed mainly in rock pools on the seacoast, and only very rarely in artificial water containers within villages. Generally, adult females of this mosquito were abundantly found at houses near to the seacoast, and the density decreased with the distance from the seacoast. Similar tendency was seen in the distribution of the patients of malayan filariasis.

Che-ju Island, Korea, which is 1,820 km² in area, is situated about 370 km south-west-west to Tsushima Islands, Japan. In the center of the Island there is a mountain with an altitude of 1,950 m and the plain area is rather small so that rice fields are not much developed. Human filariasis caused by *Brugia malayi* is known to distribute densely in the Island, in which mosquitoes were studied in 1970, 1971 and 1972 in relation to malayan filariasis. The results obtained will be reported in this paper, as the second part of studies on malayan filariasis in Che-ju Island, Korea.

MOSQUITOES FOUND IN CHE-JU ISLAND

Larvae (including pupae) and adults of mosquitoes were collected in August and September, 1970, 1971 and 1972, at nine locations on Che-ju Island, as shown in

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Fig. 1. Collections of larvae were made by a dipper and a pipette at their breeding places, and adults by an aspirator and a small hand net and also by a light trap.

Mosquito species found in Che-ju Island by collections of larvae and adults are given in Table 1. Mosquitoes collected as the larval stage belonged to 14 species, in which 8 were obtained as the adult stage also. In the below, some biological notes on the 14 species are given.

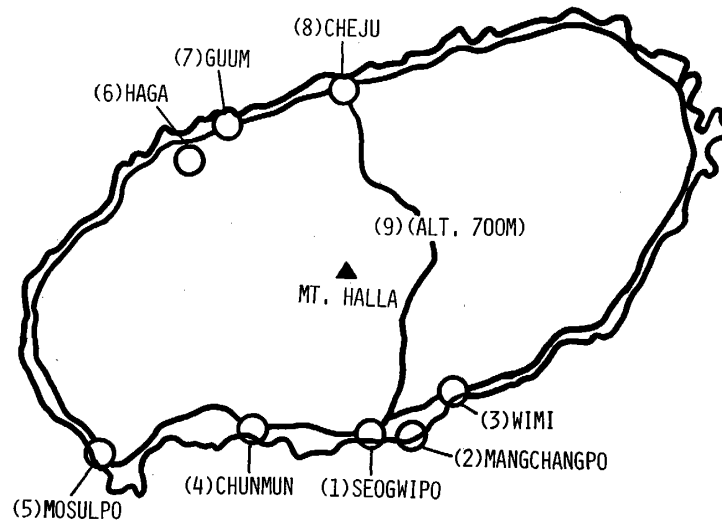


Fig. 1 A map of Che-ju Do, showing the sites of mosquito collections.

TABLE 1 Mosquito species found in Che-ju Island, August 21-September 18, 1970 and August 14-September 4, 1971

Species	Stage	Locality						
<i>Anopheles sineroides</i>	L							(9)
<i>Anopheles sinensis</i>	A, L	(1)		(3)		(6)	(7)	
<i>Armigeres subalbatus</i>	A, L	(1)		(3)				
<i>Aedes albopictus</i>	A, L	(1)		(3)	(4)		(7)	
<i>Aedes nipponicus</i>	L			(3)				
<i>Aedes hatori</i>	L				(4)			(9)
<i>Aedes japonicus</i>	L							(9)
<i>Aedes togoi</i>	A, L	(1)	(2)	(3)		(5)	(7)	
<i>Aedes vexans nipponii</i>	A, L	(1)		(3)				(9)
<i>Culex hayashii</i>	L							(9)
<i>Culex bitaenioryhnchus</i>	A, L	(1)		(3)				
<i>Culex mimeticus</i>	L							(9)
<i>Culex tritaenioryhnchus</i>	A, L	(1)		(3)		(6)		(8)
<i>Culex pipiens pallens</i>	A, L	(1)	(2)	(3)		(5)	(6)	(8)

A: adults; L: larvae

(1) Seogwipo, (2) Mangchangpo, (3) Wimi, (4) Chunmun, (5) Mosulpo, (6) Haga, (7) Guum, (8) Cheju, (9) Halfway (Alt. 700 m) up Mt. Halla

Anopheles (Anopheles) sinensis Wiedemann, 1828: Larvae were found in rice fields, ponds, and rock pools on the river bed. Adults were collected by light traps. In Japan this mosquito is a commonest species in rural areas, but rather few in number in the Island because breeding places are found only to a small extent.

Anopheles (Anopheles) sineroides Yamada, 1924: Larvae were collected from a shallow abandoned well and a small pond, situated at an altitude of ca. 700 m, halfway up Mt. Halla. This species seems to like cooler water for breeding than *Anopheles sinensis*.

Aedes (Finlaya) japonicus (Theobald, 1901): Larvae were common in rock pools on the river bed situated halfway up Mt. Halla. We were never bitten by adults of this mosquito while collecting the larvae at the daytime.

Aedes (Finlaya) togoi (Theobald, 1907): This is a commonest species in Che-ju Island. Larvae were very abundant in rock pools on the seacoast, and rare in artificial water containers in the inland area. Adults were collected in a large number in dwelling houses, particularly near to the seacoast, and also by light traps. Feeding on villagers is very active in the nighttime.

Aedes (Finlaya) hatorii Yamada, 1921: Larvae were found in rock pools on the river bed, but the number seems considerably smaller than *Aedes japonicus*.

Aedes (Finlaya) nipponicus LaCasse et Yamaguti, 1948: A larva was collected from a hole of the camellia tree at Wimi, accompanied larvae having been *Aedes albopictus*. This species seems rare in the Island.

Aedes (Stegomyia) albopictus (Skuse, 1895): This is a common species. Larvae were found in artificial containers around dwelling houses and in tree holes. Adults are a daytime feeder on man.

Aedes (Aedimorphus) vexans nipponii (Theobald, 1907): Larvae were collected in rock pools on the river bed around villages and in a ground pool halfway up Mt. Halla, and adults by light traps. The number was not very large in the Island. Adults are apparently exophilous in behavior, and scarcely found in dwelling houses.

Armigeres (Armigeres) subalbatus (Coquillett, 1898): Larvae were found in artificial containers with dirty water, and adults were encountered sometimes in dwelling houses.

Culex (Neoculex) hayashii Yamada, 1917: This species is known to be an amphibian feeder. Larvae were collected in small ponds within a forest half way up Mt. Halla.

Culex (Culex) bitaeniorhynchus Giles, 1901: Larvae were found in rock pools and ground pools on the river bed. This species was not numerous in the Island.

Culex (Culex) tritaeniorhynchus summosus Dyar, 1920: Larvae were collected from rice fields, road-side ditches, and rock pools and ground pools on the river bed, and adults by light traps. This species was rather small in number.

Culex (Culex) mimeticus Noé, 1899: Larvae were collected in a small pond halfway up Mt. Halla.

Culex (Culex) pipiens pallens Coquillett, 1898: This species is a commonest mosquito around dwelling houses in the Island. Larvae breed in artificial containers, road-side ditches, rock and ground pools on the river bed, and so on. Adults are abundant in dwelling houses, and attracted to light traps. This feeds preferably

on man.

Besides the above-mentioned species, Chun (1968) reported *Anopheles* (*Anopheles*) *lesteri* Baisas et Hu, *Culex* (*Lutzia*) *vorax* (Edwards) and *Culex* (*Culex*) *vagans* Wiedemann. These species seem to be small in number.

Dominant species of mosquitoes feeding on man can be seen more clearly by the numbers of female mosquitoes collected at dwelling houses or by using light traps set around dwelling houses, as seen in Table 2. The most dominant mosquito was *C. p. pallens*, and the next *Ae. togoi*, at dwelling houses in 1970, though the number of *Ae. togoi* seemed small at Haga which was situated some distance from the seacoast. The data by light traps show similar results excepting *An. sinensis*. The distribution of *An. sinensis* is influenced largely by the situation of rice fields, and 20 specimens of *An. sinensis* out of 272 in total by light traps at Seogwipo is probably explained by the fact that the site of light trap collection was very near to rice fields. However, the population of this mosquito in the island is considered to be rather small, owing to the small area of rice fields.

TABLE 2 Numbers of female mosquitoes collected in Che-ju Island, August 21-September 15, 1970

Collection method	At dwelling houses						By light traps				Total (%)
Locality*	(1)	(3)	(5)	(6)	Total	(%)	(1)	(3)	Total	(%)	
Number of collections	9	327	1	11	348		7	1	8		356
<i>An. sinensis</i>							20		20	(7.1)	20 (1.5)
<i>Ar. subalbatus</i>	4				4	(0.4)					4 (0.3)
<i>Ae. albopictus</i>	3	4			7	(0.6)	2		2	(0.7)	9 (0.7)
<i>Ae. togoi</i>	3	308	10		321	(29.8)	10	1	11	(3.9)	332 (24.4)
<i>Ae. vexans nipponii</i>							2		2	(0.7)	2 (0.1)
<i>C. tritaeniorhynchus</i>								1	1	(0.4)	1 (0.1)
<i>C. p. pallens</i>	159	504	64	19	746	(69.2)	238	8	246	(87.2)	992 (72.9)
Total	169	816	74	19	1,078	(100.0)	272	10	282	(100.0)	1,360 (100.0)

* (1) Seogwipo, (3) Wimi, (5) Mosulpo, (6) Haga

NATURAL INFECTIONS OF MOSQUITOES

All female mosquitoes collected at dwelling houses were, otherwise stated, preserved in 80% ethanol, on the day of, or from 4 to 10 days after collection, for later examination of filarial larvae. In 1970, mosquitoes were collected at all of 327 houses in Wimi-1-Ri, the western part of Wimi (see Table 2), therefore the natural infections of mosquitoes reflect the situation in the transmission of filariasis within the area concerned. On the other hand, in 1971 attempts were made to collect mosquitoes at dwelling houses only with microfilarial positives particularly in Mangchangpo, but natural infections can be compared between mosquito species, since all mosquitoes found were collected at each house.

The results of natural infections with each stage larvae of *Brugia malayi* in mos-

quitoes are given in Table 3. Possibility of other filariae than *B. malayi* can not completely be excluded, however it may be justified to say that all filariae found in the mosquitoes are *B. malayi* from the reasons that all the 33 infective stage (third stage) larvae showed the characteristics of malayan filariae, younger stage larvae with terminal nuclei were found only in the thorax muscle, and only malayan filariasis is reported from humans in Che-ju Island.

TABLE 3 Natural infections with each stage larvae of *Brugia malayi* in mosquitoes collected at dwelling houses, Che-ju Island, 1970 and 1971

Mosquito species	Year	Days after collection	No. of mosquitoes dissected	Total No. (%) infected	No. (%) of mosquitoes infected with		
					1st stage larvae	2nd stage larvae	3rd stage larvae
<i>Ae. togoi</i>	1970	0*	308	27 (8.8)	19 (6.2)	4 (1.2)	5 (1.6)
<i>C. p. pallens</i>	1970	0*	504	2 (0.4)	2 (0.4)	0	0
<i>Ae. albopictus</i>	1970	0*	4	0 (0.0)	0	0	0
<i>Ae. togoi</i>	1971	0*	292	12 (4.1)	3 (1.0)	3 (1.0)	6 (2.1)
<i>C. p. pallens</i>	1971	0*	329	1 (0.3)	1 (0.3)	0	0
<i>Ae. albopictus</i>	1971	0*	2	0 (0.0)	0	0	0
<i>Ae. togoi</i>	1971	4-10	264	27 (10.2)	0	9 (3.4)	22 (8.3)
<i>C. p. pallens</i>	1971	4-10	235	1 (0.4)	0	1 (0.4)	0

* Resting mosquitoes were collected in the daytime and fixed in 80% ethanol in the evening on the same day, so that it is thought that the fed females among them passed about one day or more after blood meal, since both *Ae. togoi* and *C. p. pallens* are the night-time feeder.

TABLE 4 Number of *Brugia malayi* larvae in naturally infected mosquitoes shown in Table 3

Mosquito species	Year	Days after collection	No. of infected mosquitoes	Mean (maximum) No. of <i>malayi</i> larvae/mosquito		
				1st stage	2nd stage	3rd stage
<i>Ae. togoi</i>	1970	0*	27	3.5 (12)	3.8 (8)	2.0 (3)
<i>C. p. pallens</i>	1970	0*	2	1.5 (2)		
<i>Ae. togoi</i>	1971	0*	12	2.0 (4)	1.7 (3)	2.7 (5)
<i>C. p. pallens</i>	1971	0*	1	1.0 (1)		
<i>Ae. togoi</i>	1971	4-10	27		3.2 (10)	9.2 (47)
<i>C. p. pallens</i>	1971	4-10	1		1.0 (1)	

* See Table 3

It is apparent from Table 3 that the infection rate was highest in *Ae. togoi* among three mosquito species examined. In 1970, 308 females of *Ae. togoi* were dissected and 27 (8.8%) were found infected, but among 504 *C. p. pallens* dissected only 2 (0.4%) were infected, and no infected *Ae. albopictus* were found though the number dissected was very small. It was also indicated that only in *Ae. togoi* the third stage larvae of *B. malayi* were demonstrated. Similar results were obtained also in 1971, showing the highest infection rate in *Ae. togoi* over the other two species. The low susceptibility of *C. p. pallens* is in agreement with Feng (1934) and Hu (1940a and 1948).

The numbers of *B. malayi* larvae in naturally infected mosquitoes are given in Table 4. *Ae. togoi* had many *malayi* larvae in their body; in the females examined on the day of the collection the mean numbers for the first, second and third stage larvae were respectively 3.5, 3.8 and 2.0 in 1970 and 2.0, 1.7 and 2.7 in 1971, and from 4 to 10 days after the collection in 1971 the mean numbers for the second and third stage larvae were 3.2 and 9.2. In an extreme case, one female was found to have 47 larvae in the third stage. On the other hand, the mean numbers of *malayi* larvae in *C. p. pallens* was much smaller than those in *Ae. togoi*. Among the four infected females, three had only one larva each and the remaining one had two.

It was a question why the infection rate of *C. p. pallens* was much lower than *Ae. togoi*, considering that the both species were concurrently collected in the same houses and the chances of picking up microfilariae would have been same. Dissected mosquitoes shown in Table 3 were those collected at dwelling houses in the daytime and fixed in 80% ethanol in the evening on the same day or after keeping for 4-11 days in the laboratory. For this reason, it is thought that infected *Ae. togoi* and *C. p. pallens* had passed about one day or more from the infective blood-meal to the dissection, viewing that the both species are the night-time feeder. Besides the mosquitoes mentioned above, fresh-fed mosquitoes were dissected immediately after the collection in the night at microfilarial positive houses, and it was found that infected females of *C. p. pallens* had as many microfilariae in their stomach as *Ae. togoi* did.

From these findings, it is assumed that in *Ae. togoi* the microfilariae which had entered once into the stomach of the mosquito on blood feeding develop very well to the infective stage in the thorax muscle, while in the case of *C. p. pallens* the microfilariae can be picked up by the mosquito, probably as efficiently as *Ae. togoi*, but most of them are discharged in droppings and only a few reach to the thorax from the stomach, and furthermore the mortality rate during the development to maturity is very high.

VECTOR SPECIES IN CHE-JU ISLAND

There have been known several species of mosquitoes which are susceptible to the larvae of *B. malayi*. However, it can be concluded that the main vector of malayan filariasis in Che-ju Island is *Ae. togoi*, from the facts that large numbers of females were found biting man in dwelling houses and the infection rate with the infective stage larvae was high. The suitability of *Ae. togoi* as a vector of *B. malayi*

has been reported also by Chun (1968), Gun (1960), Kim and Seo (1968), Lee (1969), and Sasa *et al.* (1951).

Although *Anopheles sinensis* is a good vector of the parasite (Feng, 1934 and 1936; Ho *et al.*, 1962; Hu, 1940b), the number is small in Che-ju Island. *C. p. pallens* is a commonest mosquito in the Island, but has an extremely low susceptibility, if any, as mentioned in the earlier section and reported by Hu (1940a and 1948).

PERIOD FOR *Brugia malayi* LARVAE TO MATURE IN MOSQUITOES

In Table 5 are given the numbers of *B. malayi* larvae by stage in the infected *Ae. togoi* females kept at room temperatures (27.4C on the average) for 4–10 days after the collection in 1971. For example, mosquito No. 13 was killed 6 days after the collection and was found to have one second stage larva in the thorax and one third stage larva each in the thorax and in the abdomen. It is rather difficult from Table 5 to give the exact period necessary for *B. malayi* larvae to mature in the mosquito, because it could not be precisely determined when each mosquito took the infective blood-meal. However, such data as Table 5 do give some informations on the developmental period. The females infected only with the second stage larvae

TABLE 5 Development of *Brugia malayi* larvae in *Aedes togoi* kept in the laboratory after the collection at microfilaria-positive houses, Che-ju Island, 1971

Days after collection	Mosquito No.	No. of 2nd stage larvae	No. of 3rd stage larvae				Total
		Thorax	Thorax	Abdomen	Head	Proboscis	
4	1	1					
5	2	1					
	3	2					
	4	10					
	5	2	7	14	7	19	47
	6				1		1
	7				1		1
	8		2	1			3
	9		2	1	3		6
	10		3	4		6	13
	11		6	22	2		30
6	12	1					
	13	1	1	1			2
	14		1				1
	15				2		2
	16		2		1		3
	17		1	1	3		5
	18		3	1	1	14	19
	19		5	4	5	10	24
7	20	9	1				1
8	21	2			1		1
	22				1		1
9	23		1				1
10	24		1				1
	25		2	1			3
	26		1	17			18
	27		3	3	2	12	20

were obtained from 4 to 6 days after the collection, those both with the second and third stage from 5 to 8 days after, and those only with the third stage from 5 to 10 days. Thus, it seems that the developmental period for *malayi* larvae to mature in *Ae. togoi* is between 6 to 9 days, if the fact that the time between the possible infective feed and the fixation in 80% ethanol is about one day or more (see Remark of Table 3) is kept in mind. This is much shorter than 12 and 15 days of the periods at 27°C and 25°C respectively for *W. bancrofti* larvae in its suitable intermediate host, *C. p. pallens* (Omori, 1957). This short period for the development of *B. malayi* is supported by reported papers, as seen in Table 6. Eight species of mosquitoes belonging to *Anopheles*, *Mansonia* and *Aedes* were examined, but all cases suggested the much shorter developmental period for *B. malayi* than that for *W. bancrofti*.

The difference in developmental period between the larvae of *B. malayi* and *W. bancrofti* in their suitable vector mosquitoes would suggest that *Ae. togoi* transmit *B. malayi* much more efficiently than *C. p. pallens* transmit *W. bancrofti*, if other situations are not different. This, in turn, implies that a higher density of vector mosquitoes would be necessary to keep a certain level of microfilarial prevalence of persons in the case of *W. bancrofti* than in *B. malayi*.

TABLE 6 Days for *Brugia malayi* larvae to become infective in mosquitoes, cited from various sources

Mosquito species	Days	Temperature	Reference
<i>Anopheles barbirostris</i>	6.5–		Brug, 1937 (Edeson, 1961)
<i>Anopheles sinensis</i>	6–12		Brug, 1922 (Belding, 1965)
	6–	29–32°C	Feng, 1934
	6–6.5	29–32°C	Feng, 1936
	6–7	27.1–28.9°C	Hu, 1940
<i>Mansonia annulatus</i>	8.5–		Poynton & Hodgkin, 1938
<i>Mansonia annulifera</i>	9.5–		Poynton & Hodgkin, 1938
<i>Mansonia longipalpis</i>	9.5–		Poynton & Hodgkin, 1938
	–10		Wharton, 1957 (Belding, 1965)
<i>Mansonia uniformis</i>	8–	29–32°C	Feng, 1934
	8.5–		Poynton & Hodgkin, 1938
<i>Aedes aegypti</i>	9–		Beckett & Boothroyd, 1969
<i>Aeges togoi</i>	8–9	24–30°C	Kim & Seo, 1968
	6–10*		Ramachandran et al., 1961

* Subperiodic *Brugia malayi*

BITING PERIODICITY OF *Ae. togoi*

To know the biting periodicity of *Ae. togoi* is important in relation to the microfilarial periodicity of *B. malayi*. Therefore hourly catches of mosquitoes were made during a night at a hut facing the seacoast of Mangchangpo. All the mosquitoes collected were *Ae. togoi*. The result is given in Table 7.

It is seen from Table 7 that the peak activity was around 2:00–4:00. However, it is usual for the pattern of hourly catches of mosquitoes to vary greatly from

TABLE 7 Hourly catches of *Aedes togoi* from the evening of August 31 to the morning of September 1, 1971 at a hut* facing the seacoast, Mangchangpo, Che-ju Island

Hours	Weather	Temp. C	No. females
19:00-20:00	cloudy	25	2**
20:00-21:00	cloudy	25	0
21:00-22:00	cloudy	25	3
22:00-23:00	rainy	24	3
23:00-24:00	rainy	24	9
24:00- 1:00	cloudy	23	3
1:00- 2:00	cloudy	23	4
2:00- 3:00	cloudy	22	30
3:00- 4:00	cloudy	23	30
4:00- 5:00	cloudy	22	12
5:00- 6:00	cloudy	23	4***

* Four persons spent the night inside the hut.

** Females resting at the dark place of the hut.

*** No females were encountered after 5:30.

day to day, possibly due largely to the difference in meteorological conditions. Without the rainy weather before the midnight, the peak of biting activity would have been found at the time nearer to the midnight. At least, it can safely be said that *Ae. togoi* in Che-ju Island is a night-time feeder, since Wada (1966) reported that *Ae. togoi* has a peak in biting activity around mid-night on Goto Islands, Japan, which is situated near to Che-ju Island, and also in our present survey neither biting nor flying of *Ae. togoi* females was encountered at the day-time during the mosquito survey at dwelling houses and at their breeding places even when it was cloudy.

DISPERSION OF MOSQUITOES

Patients of malayan filariasis in Wimi-1-Ri were apparently more frequently found in the coastal area than in the inland area. In connection with this distribution of patients, the mean number per house of the females of *Ae. togoi*, the main vector of malayan filariasis in Che-ju Island, was illustrated for each of 19 Bangs of Wimi-1-Ri in Fig. 2. It is clearly shown from Fig. 2 that the density of the mosquito was higher in the coastal area than in the inland area, indicating the close relation between the distributions of filaria patients and vector mosquitoes. For comparison, the mean numbers of another dominant species, *C. p. pallens*, were given in Fig. 3. There was not shown any tendency for the females of *C. p. pallens* to concentrate toward the seacoast.

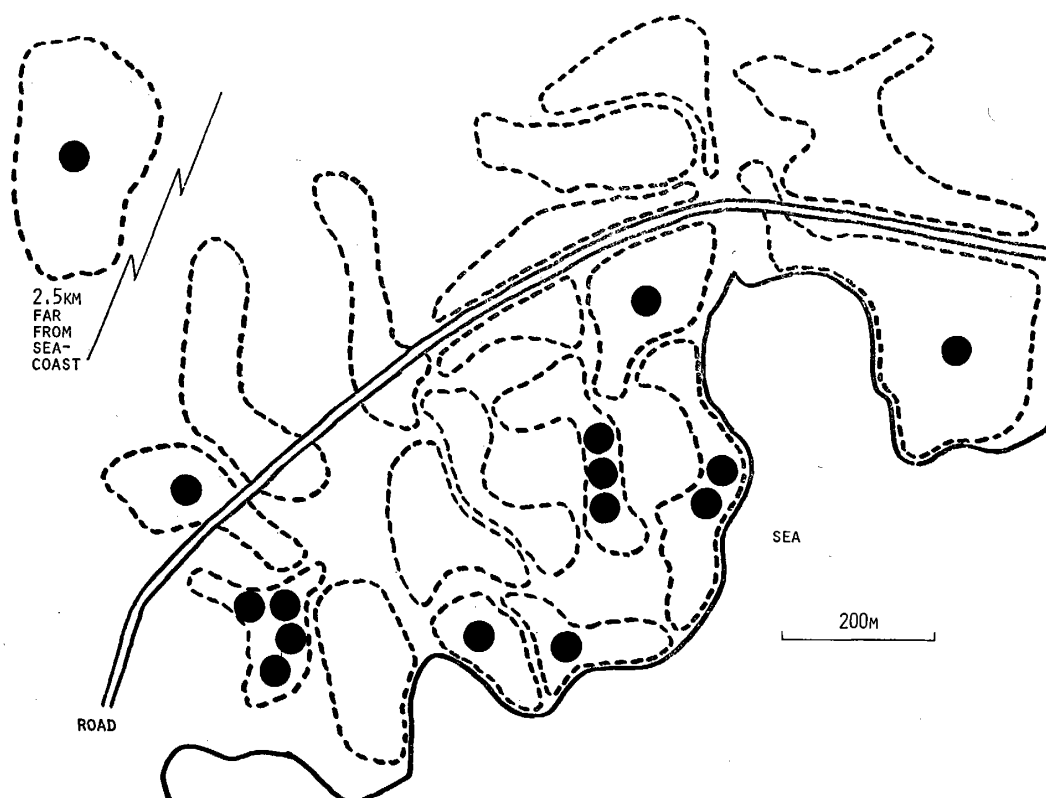


Fig. 2 Mean number per house of *Aedes togoi* females collected in each of 19 Bangs of Wimi-l-Ri, Che-ju Island, 1970. One circle represents one female, and the Bang without the circle designates that the mean number was less than O.S.

To examine the distribution tendency of mosquitoes, another attempt was made in 1972. In Wimi-l-Ri five sites were fixed for the mosquito catches by light traps, the site No. 1 being nearest to and No. 5 farthest from the seacoast, as shown in Fig. 4. Light traps were operated in 10 nights from late August to early September, and the numbers of female mosquitoes collected are presented in Table 8. It is again indicated that the density of *Ae. togoi* was generally higher at the site nearer to the seacoast while the density of *C. p. pallens*, and of other mosquitoes too, had no tendency to differ with the distance from the seacoast.

These distribution patterns of the two mosquito species can easily be understood by the facts that the larvae of *Ae. togoi* were found almost exclusively in rock pools on the seacoast, as seen in Fig. 4, while the breeding places of *C. p. pallens* were artificial containers, road-side ditches and others which were common around dwelling houses.

The fact that the breeding place of *Ae. togoi* is limited nearly to the seacoast indicates the ability for the mosquito to fly a long distance, since the females must

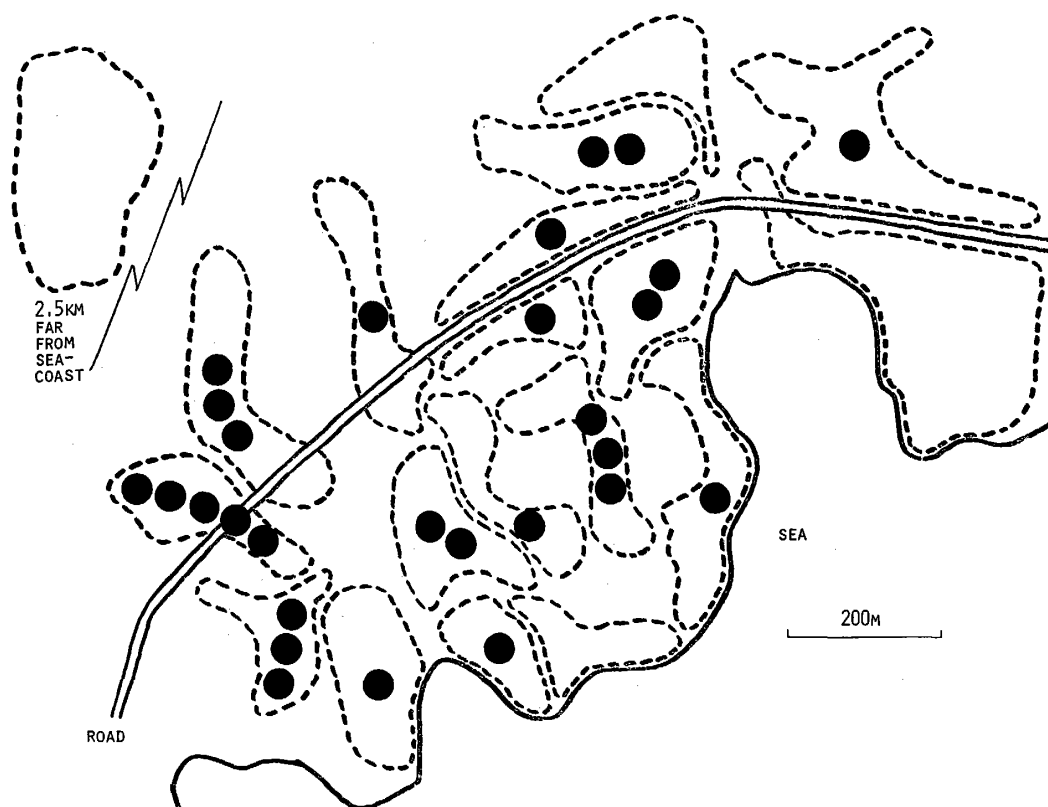


Fig. 3 Mean number per house of *Culex pipiens pallens* females collected in each of 19 Bangs of Wimi-1-Ri, Che-ju Island, 1970. One circle represents one female, and the Bang without the circle designates that the mean number was less than 0.5.

fly to dwelling houses from the seacoast to feed on man and the engorged ones must return to the seacoast to lay their eggs even when they took the blood-meal far from the seacoast. In fact, the dispersal experiment around a village in Uku Island, Nagasaki Prefecture, Japan indicated that *Ae. togoi* can fly several km (Wada *et al.*, unpublished). It is interesting that in spite of their strong flight ability the density of the females is generally higher at houses in the coastal area than at those in the inland area. In other words, the females which have just oviposited are apt to feed on blood at houses near to the seacoast. This is very important in that the risk of humans to be infected with malayan filariasis is always greater in the coastal area wherever the place with high endemicity is situated, so far as *Ae. togoi* is the main vector. Another interesting point derived from the behavior of *Ae. togoi* mentioned above is that the familial aggregation of filaria patients, as seen in the case of bancroftian filariasis transmitted by *C. p. pallens* with a short flight range (Omori, 1965), would not be expected.

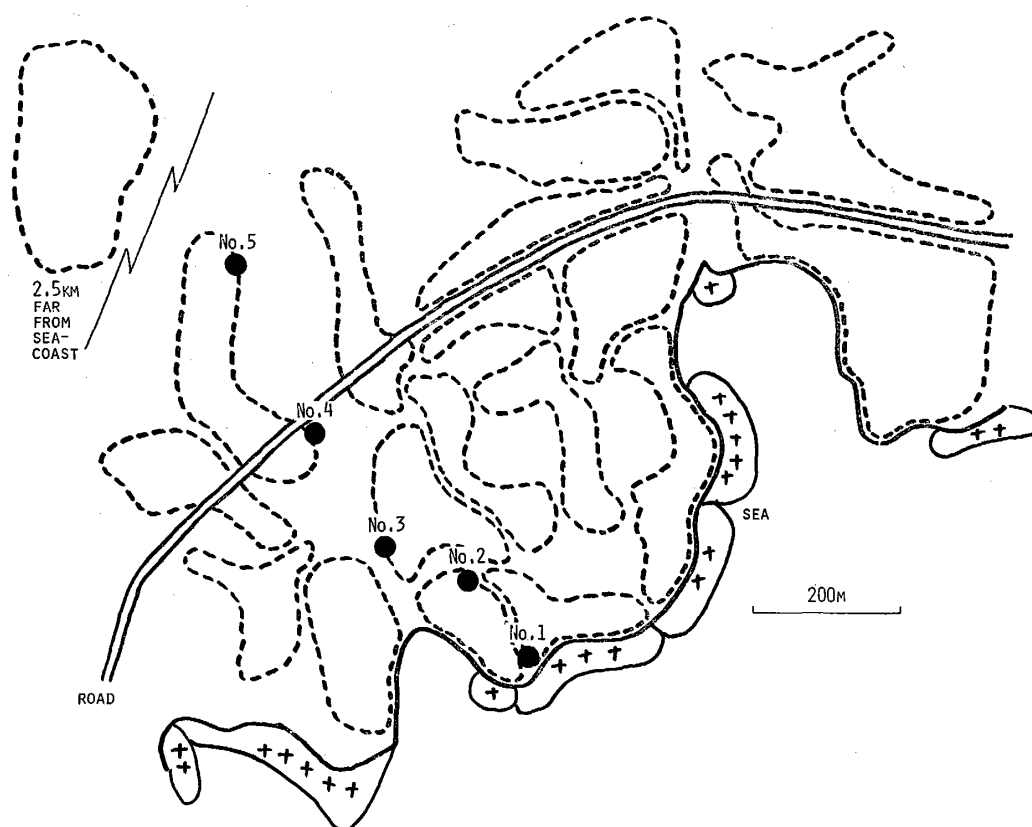


Fig. 4 A map of Wimi-1-Ri showing the sites of light trap collections in 1972 (No. 1-5) and the relative density of *Aedes togoi* larvae (plus signs).

TABLE 8 Numbers of female mosquitoes collected by light traps at the five sites in Wimi-1-Ri in 10 nights from late August to early September, 1972

Collection site No.*	1	2	3	4	5	Total
<i>An. sinensis</i>	2	4	2	4	6	18
<i>Ar. subalbatus</i>	1		4			5
<i>Ae. togoi</i>	168	112	120	51	82	533
<i>Ae. vexans nipponii</i>		1			3	4
<i>C. p. pallens</i>	11	8	39	13	7	78

* See Fig. 4

ACKNOWLEDGEMENT

We wish to express our cordial appreciation to Dr. B. S. Seo, Dr. H. J. Rim, Dr. J. H. Kim, and other staffs of the Department of Parasitology, Seoul National University who kindly cooperated with us. Our sincere thanks are also due to the Japanese members of the survey teams, particularly Dr. A. Sato of the Department

of Medical Zoology, Kagoshima University School of Medicine, for their encouragement and help.

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韓国濟州島のマレー糸状虫に関する研究

2 マレー糸状虫の伝搬蚊

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濟州島において1970～1972年の8, 9月に蚊の採集を行なって合計14種を得たが, その中で人家内で住民から主として吸血をするのはアカイエカとトウゴウヤブカであった。また, マレー糸状虫の感染幼虫による自然感染はトウゴウヤブカにおいてのみ見られた。以上のことから, 濟州島におけるマレー糸状虫症の主伝搬蚊はトウゴウヤブカと考えられる。他地方でマレー糸状虫症の伝搬者として知られるシナハマダラカは, 濟州島では幼虫の発生場所が極めて少なく, 伝搬に重要な役割を果しているとは考えられない。マレー糸状虫の幼虫がトウゴウヤブカ体内で成熟するに要する日数は, 患家で採集した雌成虫を種々の期間飼育の後に解剖した成績から, 夏では6～9日と推定された。これはバンクロフト糸状虫の場合と比べるとずっと短い。トウゴウヤブカの幼虫は主として海岸の岩の水たまりから発生し, 部落の中での発生は極めて少ない。本種の雌成虫は海岸近くの人家で多く, 内陸部に入るほど少なくなる傾向が見られ, マレー糸状虫症の患者の分布にも同様の傾向が見られる。

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