Studies on Mosquitoes in Jeju-Do

1. Ecological study of mosquitoes in Jeju-Do

by

Moon You, Oh

Introduction

Jeju Island is situated far from the mainland and in the center of the Island there is a mountain with an altitude of 1950m. And the plain area is rather small, so that villages develop mostly along the seacoast.

It is the purpose of this study to classify the mosquito species ecologically in Jeiu Island. And some day it will be published which species of mosquito contribute as vectors of malayan filariasis found among the inhabitants who live in the villages along the seacoast, and *Dirofilaria immitis* of canine in Jeju-Do.

Places and methods of mosquito collections

Larvae(including pupae) and adults of mosiquitoes were collected at eight locations on Jeju-Do, as shown in 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 by a light trap. Classification of mosquito species was made with the "Pictorial keys to the mosquitoes of Korea" published by W.H.O.

Mosquitoes in JeJu-Do

Mosquito species found in Jeju-Do by collections of larvae and adults is given in Table 1, and the number of female mosquitoes collected in Table 2. Mosquitoes collected as the larval stage belonged to 12 species, in which 7 were obtained as the adult stage also. In the below, notes on the 12 species are given.

Anopheles (Anopheles) sinensis Wiedemann, 1828 : Larvae were found in paddy-fields, ponds, and rock pools on the river bed. Adults were collected by light traps. This mosquito is a commonest species in rural areas in Japan, but rather few in number in theisland because breeding places are found only to a small extent. This has been reported as an important vector of malayan filariasis in China(Feng, 1936 : Gun, 1960 : Hu, 1940), But in Jeju Island it does not seem to play, if any, an important role because of being small in number.

Anopheles (Anopheles) sinerotdes Yamada, 1924 : Larvae were collected from a shallow abandoned well, which had been used for drinking water, situated at altitude of ca. 800 m, halfway up Mt. Halla. This species seem 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 and a main vector of malayan filariasis in Jeju Island. Larvae were very abundant in rock pools on the seacoast, and rather rare in artificial water containers in the inland area. Adults were collected in a large number in dwelling houses, particularly near the seacoast. Feeding villagers is very active.

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 tree-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 are 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 is not so 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 (*Culex*) *bitaeniorhynchus* Giles, 1901: Larvae were found in rock and ground pools on the river bed. This species is not numerous in the Island.

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

Culex (*Culex*) *pipiens pallens* Coquillett, 1898 : This species is a most common mosquito around dwelling houses. Larvae breed in artificial containers, road-side ditches, rock and ground pools on the river bed, and so on. Adults are abundant in dwelling housas, and attracted to light traps. This feeds preferably on man, and is the main vector of bancroftian filariasis in Japan, but malayan filariae probably can not develop to infective stage in the body of this culicine.

Discussion

Chun (1968) reported 13 species of mosquitoes to occur in Juju-Do, except the following 3 species I found through this study; *Armigeres* (*Armigeres*) *subalbatus*, *Aedes* (*Finlaya*) *nipponicus*, and *Aedes* (*Finlaya*) *japonicus*.

Through the survey in August and September, 1969, W.H.O. studying team reported 15 species of mosquitoes occur in Jeju-Do, except the following 3 species; *Anophles*(*Anopheles*) *sineroides*, *Aedes*(*Finlaya*) *nipponicus* and *Culex*(*Culex*) *bitaeniorhynchus*. From this study I could add one more species.

According to the Itagaki's and Kume's study, *Aedes togoi* was the most adequate for development of the microfilariae of *Dirofilaria immitis*, and they can develop in the *Culex pipiens, Aedes albopictus*, too. Malayan filariae prefer to develop to infective stage in *Aedes togoi*, as microfilariae of *Dirofilaria immitis* do. I think it will be much interesting study to compare with these two types.

References

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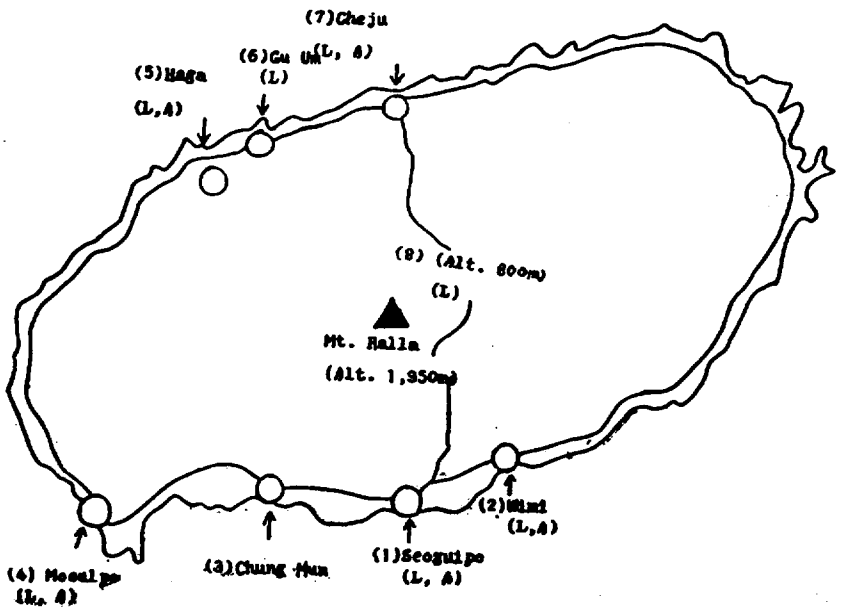

Fig. 1. A Map of Jeju Island, Korea, showing the locations of mosquito collections. L and A in parentheses indicate collections of larval and adult mosquitoes, respectively.

Table 1 Mosquito species found in Jeju Island

Species	Stage	Location						
Anopheles sinensis	A, L	(1)	(2)			(5)	(6)	
Anopheles sineroides	L							(8)
Aedes japonicus	L							(8)
Aedes togoi	A, L	(1)	(2)		(4)		(6)	
Aedes hatorii	L			(3)				(8)
Aedes nipponicus	L		(2)					
Aedes albopictus	A, L	(1)	(2)	(3)			(6)	
Aedes vexans nipponii	A, L	(1)	(2)					(8)
Armigeres subalbatus	A, L	(1)	(2)					
Culex bitaeniorhynchus	L		(2)					
Culex tritaeniorhynchus summorosus	A, L	(1)	(2)			(5)	(7)	
Culex pipiens pallens	A, L	(1)	(2)		(4)	(5)	(7)	

A : adults; L : larvae

(1) Seoguipo, (2) Wimi, (3) Chungmun, (4) Mosulpo, (5) Haga, (6) Gu-um

(7) Jeju, (8) Mt. Hallla(Alt. 800m)

Table 2. Number of female mosquitoes collected in Jeju Island

Collection methods	At dwelling houses					By light traps			Total (%)
Location*	(1)	(2)	(4)	(5)	Total (%)	(1)	(2)	Total (%)	
An. sinensis						20		20(7.1)	20(1.3)
Ae. togoi	30	312	10		352(27.8)	10	1	11(3.9)	363(23.5)
Ae. albopictus	8	4			12(0.9)	2		2(0.7)	14(0.9)
Ae. vexans nipponii						2		2(0.7)	2(0.1)
Ar. subalbatus	33				33(2.6)				33(2.1)
C. tritaeniorhynchus summorosus							1	1(0.4)	1(0.06)
C. P. pallens	277	504	64	19	854(67.7)	238	8	246(87.2)	1110(71.9)
Total	348	820	74	19	1261(100.0)	272	10	282(100.0)	1543(100.0)
Number of collections	36	828	1	11	376	7	1	8	384

* (1) Seogwipo (2) Wimi, (4) Mosulpo, (5) Haga.

Summary

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I found 12 species of mosquito through this study from Aug., 1970 to Dec., 1971. The followng three species were added to Chun's list: *Armigeres (Armigeres) subalbatus, Aedes (Finlaya) nipponicus*, and *Aedes(Finlaya) japonicus*. And three to W.H.O. studying team's list: *Aedes (Finlaya) nipponicus, Anopheles (Anopheles) sineroides*, and *Culex(Culex) bitaeniorhychus*. Then, there were found 18 species of mosquito in Jeju-Do. They are as follows:

Anopheles (Anopheles) sinensis, Anopheles (Anopheles) sineroides, Aedes (Finlaya) japonicns, Anopheles lindesayi japonicus, Aedes (Finlaya) togoi, Aedes (Finlaya) hatorii, Aedes (Finlaya) nipponicvs, Aedes (Stegomyia) albopictus, Aedes (Aedimorphus) vexans nipponii, Tripteroides bambusa, Armigeres (Armigeres) subalbatus, Culex (Culex) bitaeniorhynchns, Culex(Culex) tritaeniorhynchus, summorosus, Culex(Culex) pipiens pallens, Culex hayashii, Culex fuscanus, Culex orientalis, Culex kyotoensis.

제주도 산(産) 모기(蚊)에 관한 연구

吳 文 儒

著者는 1970년 8월부터 1971년 12월까지 사이에 제주도의 8개지역에서 모기(蚊)의 유충 및 성충을 채집하여 분류한 결과 다음과 같이 12종으로 분류되었다. 이는 전[1] (1968)氏의 보고에 3종 (*Armigeres subalbats, Aedes nipponicvs, Aedes joponicus*)을 추가하게 되고 W.H.O의 보고에 3종 (*Aedes nipponicus, Anopheles sineroides, Culex bitaeniorhynchus*)을 추가하여 제주도에 서식하는 모기(蚊)의 종류는 18종이 된다.

1) *Anopheles sinensis*
2) *An. sineroides*
3) *Aedes japonius*
4) *Ae. togoi*
5) *Ae. hatorii*
6) *Ae. nipponichus*
7) *Ae. alboqictus*
8) *Ae, vexans nipponii*
9) *Armigeres subalbatus*
10) *Culex bitaeniorhynchus*
11) *C. tritaeniorhynchus summorosus*
12) *C. pipiens pallens.*