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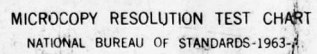
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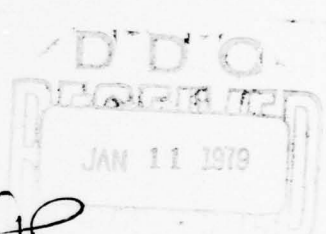
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6 A BIOMETRIC STUDY OF FILARIASIS ~~AND~~ WUCHERERIA BANCROFTI ³
IN THE SOUTH PACIFIC AREA FOR APPLICATION TO A DISEASE
FORECASTING SYSTEM.

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9 Final Comprehensive Report

Approved for public release: distribution unlimited

Prepared for

US ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
FORT DETRICK, MARYLAND 21701

Prepared by

US ARMY MEDICAL INTELLIGENCE AND INFORMATION AGENCY
WASHINGTON, DC 20314

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The findings in this report are not to be construed
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I. INTRODUCTION

For those who will read this report it would seem helpful to give, as a prologue, a background history of the genesis and administrative alterations of this project. The project has its origins in the informal discussions the Principal Investigator held in June, 1973, with Colonel Hinton Baker, then Director of the Division of Biometrics and Medical Information Processing, WRAIR. Colonel Baker had initiated a Disease Forecasting System which would predict, based on environmental factors, the geographic distribution of any given infectious disease as well as provide a quantitative assessment of a non-immune's risk of contracting the infection upon entering the endemic area. An example of the program's design may be given by quoting the "technical objective" of the research proposal submitted for this contract: "The aim would be to provide a quantitative risk assessment of a non-immune's risk to infection with sub-periodic Wuchereria bancrofti in the South Pacific area. It is also expected that the proposed study will contribute to the development of a general mathematical model descriptive of filarial transmission."

The methodology of the project called for a collaborative effort between the staff of the Department of Disease Information, Division of Biometrics and Medical Information Processing and the Principal Investigator and his associates. The primary responsibility of the contractee was to obtain all available literature, reports, etc. on the assigned infection within defined geographic limits and to "parse" this data on a standard form. The geographer of the Department of Disease Information was to fill in pertinent data and then all the information would be entered into a computer program.

Upon this collaborative assumption the Principal Investigator and his Research Associates, Mr. Ettl and Ms. Stansbury, began in November, 1973, to extract data from the published literature and other documents and entered the information on the form devised by Colonel Baker's group. Then, early in 1974, Colonel Baker retired from military service. The programs and contracts of the Department of Disease Information were transferred to the newly created U.S. Army Medical Intelligence and Information Agency under the direction of Lieutenant Colonel Kenneth Stuart. Colonel Stuart and I, in an exchange of correspondence and in personal meetings in June, 1974, reviewed the objectives of the Contract as they were now viewed by our new directing Agency. What emerged from these exchanges was the mutual agreement that the primary goal was to provide as complete a picture of the current epidemiological status of filariasis in the Polynesian South Pacific area (including Fiji) as possible. Construction of mathematical models to illustrate the mechanisms of transmission and risk potential was to be carried out, as

subordinate aims, only to the extent that the data and personnel resources permitted. It is within this new frame of reference that this Final Report has been written.

Why filariasis? The lymphatic filariasis caused by Wuchereria bancrofti and Brugia malayi constitutes one of the most highly endemic parasitic infections of the tropical world. The World Health Organization 1974 Expert Committee on Filariasis notes:¹ "It is estimated that at least 250 million people throughout the world are infected with Wuchereria bancrofti and Brugia malayi." This assessment is based on relatively insensitive diagnostic methods and recent epidemiologic investigations employing the considerably more sensitive membrane filtration diagnostic method² indicate that 2 to 4 times as many people are infected as formerly thought²⁻⁴. Moreover, an appreciation of the current epidemiologic status of filariasis is important since in recent years there have been major changes in the global prevalence pattern. Bancroftian filariasis in the tropical cities of the world has increased with the migration of masses of people from rural areas to urban areas.⁵ Their settlement in the cities has resulted in a process of "ghettoization" with attendant production of habitats suitable for the breeding of the main vector of Wuchereria bancrofti, Culex pipiens fatigans. For example, neither C. p. fatigans nor bancroftian filariasis occurred in Hyderabad, India in 1944, but by 1961, C. p. fatigans was plentiful in the city and there is now evidence for the local transmission of the infection. A similar phenomenon has occurred or is occurring in other cities such as Rangoon and Jakarta.

In West Africa where C. p. fatigans occurs but is not infected with Wuchereria bancrofti, there is need for vigilance because Wuchereria bancrofti is present in rural areas surrounding the cities and can undergo complete development in C. p. fatigans. In West Africa too it is probably only a matter of time before the same sequence of events, inward migration - ghettoization - filariasis, occurs.

In contrast, the situation in many parts of the South Pacific has greatly improved these past 15 years due to mass drug (Hetrazan) administration (MDA) anti-filariasis campaigns. In general, the ubiquitousness and breeding habits of the mosquito vectors have not permitted vector control to be applied as a means of interrupting transmission. Mass drug administration of diethylcarbamazine (Hetrazan) appears to be an effective anti-filarial measure, but in most parts of the world the population numbers are too great and the endemic areas too vast for MDA to be applied -- particularly when the affected countries' relative poverty of finances and scarcity of medical personnel are considered. However, the islands of the Polynesia with their relatively small population, size and isolated boundaries have been ideal for anti-filariasis campaigns by MDA and, in view of the altering patterns of

endemicity in this area, it was felt that a current overview of epidemiological intelligence would serve a useful purpose.

And why filariasis as a military concern? The past military significance of filariasis in the South Pacific has been summarized by Beaver.⁶ In reviewing the experience of World War II campaigns in the South Pacific, he states ". . . among the men exposed to filariasis on Samoa and certain other islands, a very high proportion up to 70% in some units acquired the infection" and "It is well documented that within a period of about 1 year, over 12,000 men acquired the infection and for the period 1942 to 1945, the estimates run much higher." Nor were these benign infections; the affected soldiers suffered retrograde lymphangitis, lymphedema, lymphadenitis and genital manifestations. Beaver also believes that there was, in many cases, an associated pulmonary disease. It is of interest that a detectable microfilaremia was not observed in these servicemen although the finding of adult worms by biopsy leaves no doubt as to the filarial etiology of these signs and symptoms. This present report is essentially concerned with filarial endemicity in indigenous populations. In these peoples filariasis presents as a wide clinical spectrum with many apparently asymptomatic individuals who have a patent microfilaremia. It should be pointed out that adult non-immunes such as military personnel or transmigrants coming from non-endemic areas seem to have a different susceptibility. These individuals frequently develop the clinical constellation associated with early pre-patent or non-patent microfilaremia that was described above. Such filariasis, therefore, deserves careful consideration in planning for the health maintenance of troops to be stationed in endemic areas or in the planning of military campaigns in these areas.

BIBLIOGRAPHY

Part I

1. World Health Organization Expert Committee on Filariasis, third report WHO Technical Report Series no. 542, 1974.
2. Desowitz, R.S. and B.A. Southgate. 1973. Studies on filariasis in the Pacific: 2. The persistence of microfilaraemia in diethylcarbamazine treated populations on Fiji and Western Samoa: Diagnostic application of the membrane-filtration technique. Southeast Asia J. Trop. Med. Pub. Hlth., 4: 179-183.
3. Desowitz, R.S., B.A. Southgate and J.U. Mataika. 1973. Studies on Filariasis in the Pacific 3. Comparative efficacy of the blood-film, counting-chamber and membrane filtration techniques for the diagnosis of Wuchereria bancrofti microfilaraemia in untreated patients in areas of low endemicity. Southeast Asia J. Trop. Med. Pub. Hlth., 4: 329-335.
4. Desowitz, R.S. and Hitchcock, J.C. 1974. Hyperendemic bancroftian filariasis in the Kingdom of Tonga: The application of the membrane-filter concentration technique to an age stratified blood survey. Am. J. Trop. Med. Hyg., 23: 877-879.
5. Gratz, N.G. 1973. Mosquito-borne disease problems in the urbanization of tropical countries. CRC Critical Reviews in Environmental Control. 455-495.
6. Beaver, P.C. 1970. Filariasis without microfilaremia. Am. J. Trop. Med. Hyg., 19: 181-187.

II. EPIDEMIOLOGY

A. Introduction

Wuchereria bancrofti is a filarial parasite, transmitted by mosquitoes, in which the adult is present in the lymphatics and the microfilaria are found in the blood. It is exclusively a parasite of man and despite many attempts it has not been possible to produce a mature infection in any experimental animal. W. bancrofti exists in two "forms," divisible by the behavior of the microfilariae into "periodic" and "sub-periodic." In periodic W. bancrofti, the microfilariae exhibit a circadian rhythm, disappearing or being very much reduced in number from the peripheral vasculature during the day and then attaining peak density in this segment of the blood system at night (usually between 2200 and 0200 hours). Sub-periodic W. bancrofti microfilariae are found in the peripheral blood for all 24 hours of the day with somewhat higher peaks during the afternoon. The mechanism(s) responsible for periodicity is not known with any certainty but it probably represents an evolutionary adaptation to the feeding behavior of the local mosquito vector, i.e., periodic forms utilize night biting vectors while sub-periodic W. bancrofti are transmitted by day biting species. There is evidence that during the day the periodic microfilariae are sequestered in the small vasculature of the lungs and Hawkins¹ speculates, "The accumulation (in the lungs) is due to an active reflex by the microfilariae themselves; and it probably depends on a sideways migration through the precapillary network of arterioles. The factor in the lungs which holds up the passage of the microfilariae so that they accumulate there is the great increase in oxygen tension, which may be termed the 'oxygen barrier.'"

The distribution of periodic W. bancrofti is: Sub-Saharan tropical Africa where it is a rural disease transmitted by Anopheles gambia and An. funestus; the coastal plains of Central American and South America, particularly on the east side of the continent as well as some islands of the West Indies where the main vector is C. p. fatigans. In the Mediterranean-North African region, periodic W. bancrofti is present in small foci in Egypt where it is transmitted by C. p. fatigans and in the city of Alanya in Turkey where the vector is C. p. molestus. In Asia, periodic W. bancrofti is an urban infection transmitted by C. p. fatigans with a range from India to Ceylon through China and Japan to South East Asia and Indonesia and the Bicol Peninsula of the Philippine Islands. Endemic Pacific region areas of periodic bancroftian filariasis are Melanesia (New Guinea, Bismark Archipelago, the Solomons) and New Hebrides where the vectors are mainly Anopheles farauti, An. koliensis and An. punctulatus and in Micronesia (Mariana, Caroline, Marshall and Gilbert Islands and Nauru) were C. p. fatigans in the vector.

Sub-periodic (non-periodic, diurnal) W. bancrofti transmitted by the Aedes scutellaris group occurs in the Polynesian zone of the Pacific. This zone, which is the main geographical area considered in this report, includes Fiji, Rotuma, the Ellice Islands and all the island groups extending eastward from the latter to the Tuamotu Archipelago and the Marquesas Islands. Sub-periodic bancroftian filariasis is also present in New Caledonia and the Loyalty Islands where it is transmitted by Aedes vigilax. Periodic filariasis, endemic in Micronesia, is discussed briefly.

The variation of W. bancrofti in different geographic areas with respect to periodicity, vector and pathogenesis has led a number of workers to speculate on their taxonomic-genetic relationship. Manson-Bahr and Muggleton considered that the Polynesian sub-periodic form was a distinct variety and should be designated W. bancrofti var. pacifica. Morphometric observations on microfilariae have been carried out by Schacher and Colless and these papers should be consulted regarding the suggested designation of W. bancrofti into demes and sibling species.

B. Procedure

1. Introduction

As indicated in the introduction of this report, the Principal Investigator's responsibility under this contract was to collect, screen and analyze published articles and all other obtainable documents relating to filariasis in the Polynesian region of the Pacific and other material pertinent to the "epidemiological charge." All documents were xeroxed and forwarded to the U.S. Army Medical Intelligence and Information Agency. During July, Mr. Ettl, Research Associate, visited Fiji, Samoa and Tahiti in order to search for and photocopy unpublished data in the various medical department archives.

During the period of this contract, a total of 390 published articles were screened. From these, 160 articles, were selected as pertinent and 6032 pieces of information were extracted and entered into the computer data bank. Of these 6032 citations, 5648 related to filariasis, 384 related to diseases other than filariasis.

The information was placed in a storage/retrieval program known as FAMULUS and is presently stored in the computer at the Division of Biometrics and Data Information Processing at Walter Reed Army Institute of Research. For further information relating to the use of the data base and a description of the computer program, contact the U.S. Army Medical Intelligence and Information Agency, Washington, D.C. 20314.

Distribution and mapping of infections and vectors was done, in consultation with the Principal Investigator, by Ms. Eleanor R. Cross, Medical Geographer, USAMIIA.

The mathematical model was, essentially, the work of Mr. John Ettl, Research Associate, with the assistance of Ms. Lynn Stansbury, Research Associate, and the Principal Investigator. It will be published under separate cover at a later date.

2. Geographic Distribution of Infection

a. Human Disease

The information regarding prevalence in the various territories is based upon the reports available. The categorization of prevalence rates -- low = 0.1 to 9.9%, moderate = 10.0 to 49.9%, high = greater than 50.0% -- was deliberately made quite broad and general because the method used and the date of observation was considered only superficially. An attempt was made, however, to map the highest prevalence rates found prior to institution of control measures and treatment. This was done in order to give some idea of the potential risk of infection in the event that anti-filarial projects, where undertaken, would break down and the infection would revert to its former "natural" endemic level. It was felt that this would be the most useful form of presentation for military purposes. A narrative and tabulated description of what is known of the present situation is also given.

b. Geographic distribution of Mosquitoes

An attempt was made to map the geographic distribution of all the mosquitoes on which point observations were available. The charts present categorized data on all mosquitoes for which information was available in the computer from the articles extracted. In some cases, the information is contradictory. These conflicting observations have been left in the charts with the hope that future surveys and taxonomic-bionomic studies can resolve the inconsistencies. It is hoped that as these inconsistencies are resolved, the documented evidence will be sent to USAMIIA so that the correct information can be included in the computer file on filariasis.

3. Bibliography

Each extracted article was given a document number and the citations were placed in a computer program. The numbers, therefore, refer to the document number and have been cited as such in this report. Microfilmed copies of the documents are available upon request from USAMIIA.

A complete bibliography of the 160 documents extracted is included at the end of this report. Documents referring to specific geographic locations are listed at the end of each section and have been divided into documents containing information on human disease and documents containing information on mosquitoes.

BIBLIOGRAPHY

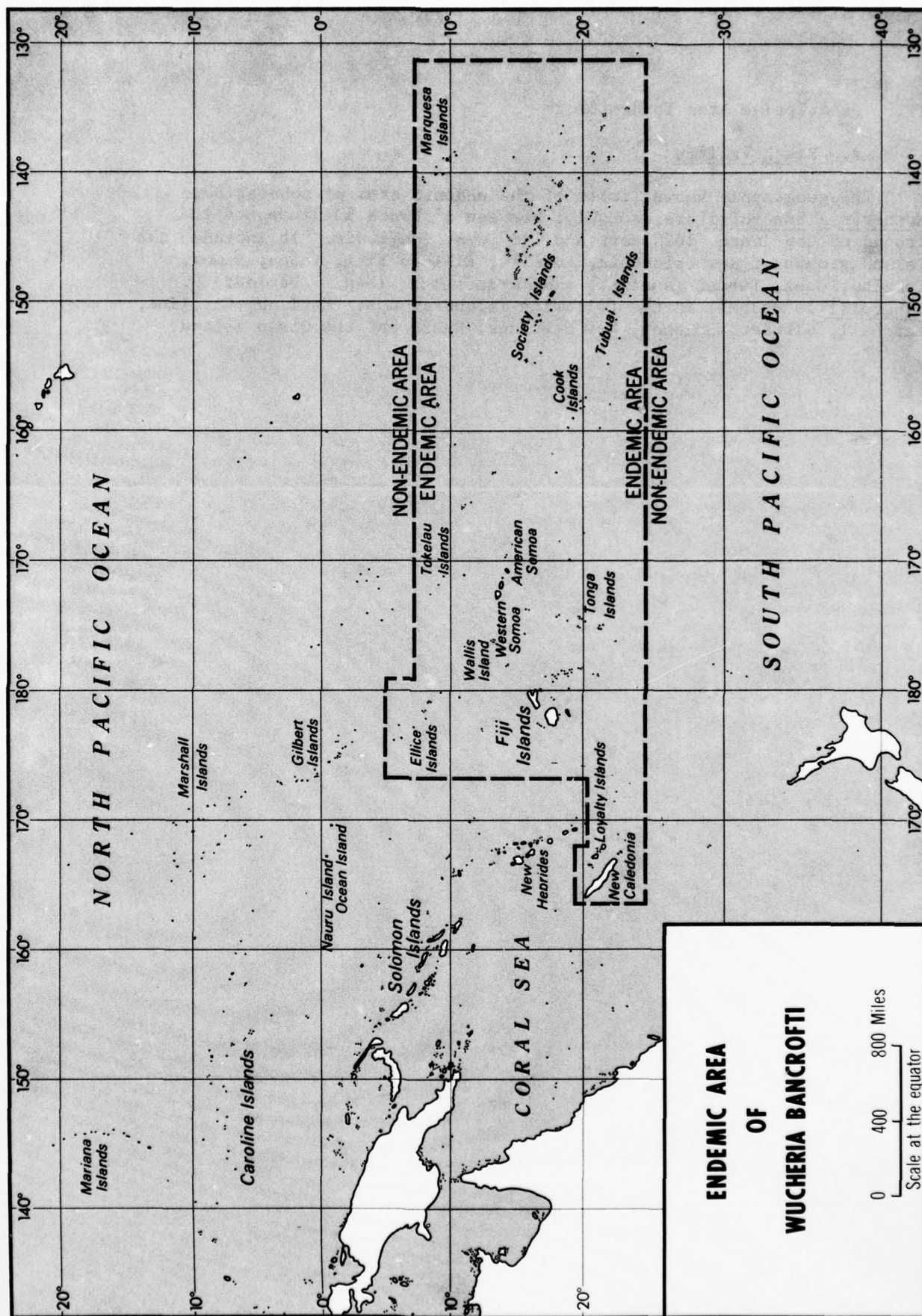
Part II

1. Hawking, F. 1964. Advances in filariasis. Roy. Soc. Trop. Med. Hyg. 10: 9-21.

III. Descriptive Area Epidemiology

A. South Pacific

The geographic known limits of the endemic area of sub-periodic Wuchereria bancrofti are, roughly, between 5° south latitude and the Tropic of Capricorn, 162° east and 130° west longitude. It includes the island groups of New Caledonia, Loyalty, Ellice, Fiji, Tonga, Samoa, Tokelau, Cook, Tubuai (Austral) and Marquesas. (Map 1) Periodic W. bancrofti is endemic in the following island groups: Mariana, Caroline, Marshall, Gilbert, Solomon, New Hebrides, Nauru and the Ocean Island.



SOUTH PACIFIC ENDEMIC AREA

B. Fiji Islands

1. Human Data

Map 2 presents the geographic distribution of the highest prevalence rates recorded in the articles extracted into the Disease Information System. Treatment and mosquito control measures were first introduced in 1952. Since then, treatment of humans and control of mosquitoes have been instituted periodically with the most recent efforts being in 1969, 1970 and 1972. The most recent prevalence rates in the articles in the Disease Information System are presented in Table 1.

2. Mosquito Data

Information on the role and bionomics is presented in Table 2. The numbers refer to the Bibliography. As stated previously, some information is contradictory. It is hoped that such contradictions will be resolved in the future, for little information is available for some species while for others, taxonomic status is uncertain. No attempt was made to provide detailed information on the mosquitoes other than the vector species.

3. Viti Levu

a. Human Data

The geographic distribution of the highest prevalence rates for Viti Levu is presented in Map 3. In general, the rates are in the moderate, (10.0 to 49.9%) range. Most surveys were conducted on the southern coast.

b. Mosquito Data

The geographic distribution of the various mosquitoes for which detailed information on location was available is presented in Maps 4 to 14. As with human surveys, most information is available for the southern coast.

4. Vanua Levu + Tavenui

a. Human Data

The geographic distribution of the highest prevalence rates is presented in Map 15. The majority of the highest rates are in the moderate (10.0 to 49.9%) range with a few in the low (0.1 to 9.9%) range.

b. Mosquito Data

Surveys have been conducted throughout the coastal areas of the islands. Information on these two islands was recorded as either present or absent. The designation of absence of individual mosquito species is of great importance in describing the geographic distribution, particularly if definite areas can be designated as areas where the mosquito species is not found and, thus, the possibility exists that environmental conditions within this area are not favorable for that mosquito species. Still, caution must be observed, and the true designation of absence should be considered truly valid only after repeated surveys. This was not necessarily true in the data used to compile these maps. If a particular species of mosquito has been found to be present in a location recorded as absent, this information should be sent to USAMIIA so that the map can be updated and the error corrected. (Maps 15-23)

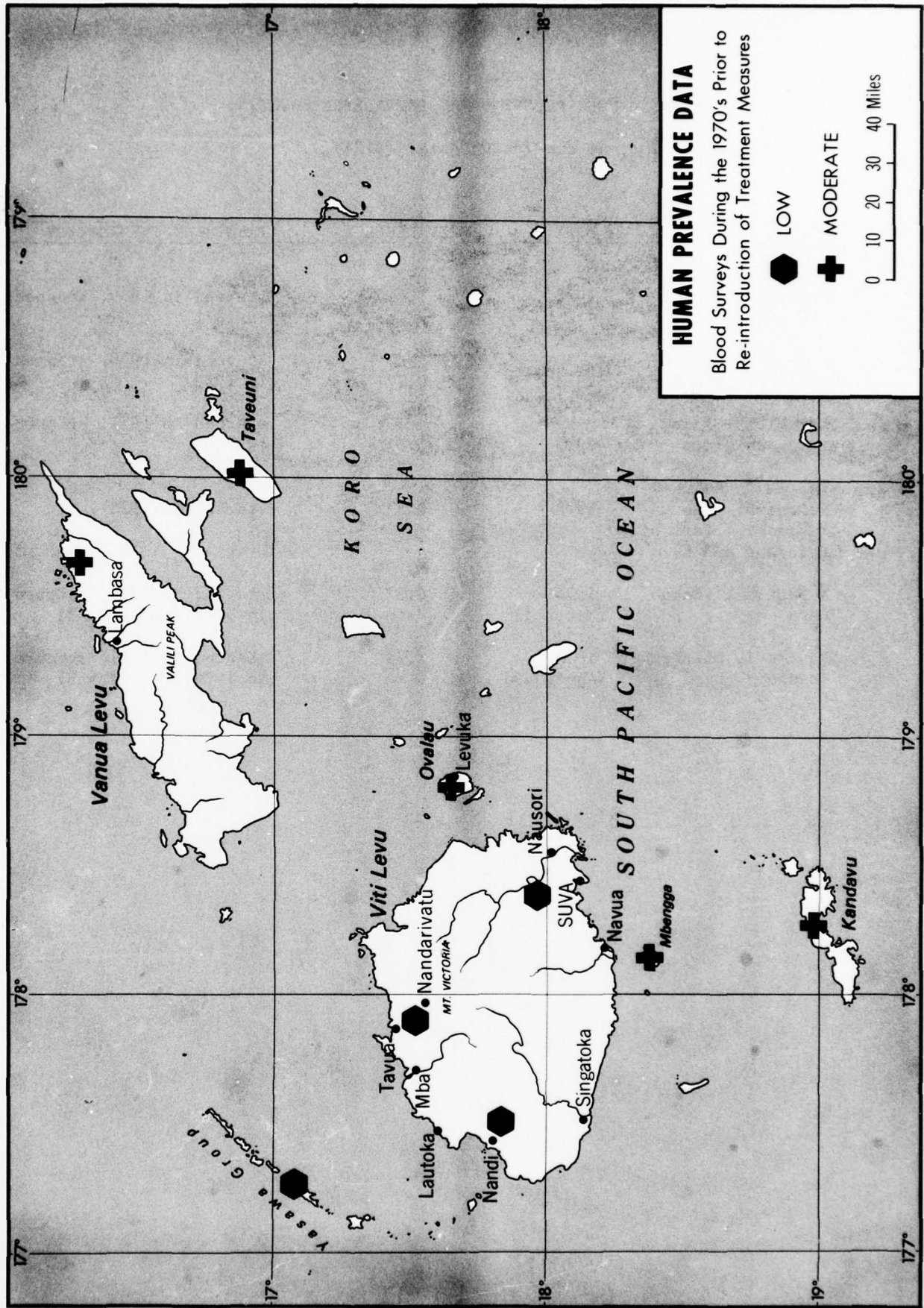


Table 1 FIJI ISLANDS - MOST RECENT HUMAN PREVALENCE RATES

Capillary Blood, 60 cmm (3x20) smear (2124)

LOCATION	DATE	PREVALENCE	TREATMENT INFORMATION
Cakaudrove + Rotuma + Part of Bua + Koro	1972	1.0%	started in 1969, stopped in 1971
Macuata + Part of Bua + Lau Group	1973	0.7%	started in 1970, stopped in 1972
Lomaviti + Kadava + Yasawa Group	1973	0.5%	started in 1971, stopped in 1972
Tailevu + Rewa + Naitasiri + Serua + Namosi + Part of Nadoroga and Ra	1973	0.8%	started in 1972
Nabautini, Vanua Levu	1974 (March 5)	0.0%	started in 1972, stopped in 1974 (February 3)
Raviravi, Mbengga Island	1974 (April 17)	1.7%	started in 1972, stopped in 1974 (February 3)

Table 2

FIJI ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	major vector. (2042) non-periodic vector. (2036) demonstrated carrier of <i>Microfilaria fijiensis</i> (fruit bat). (2000)	bush. prefers calm or slightly moving air, not very active in wind moving at more than 3 or 4 knots more numerous in the vicinity of clumps of vegetation or large trees than elsewhere. (2000)	containers, coconut shells, crab holes, tree holes, bamboo. (2000) prolific breeding in piles of coconut shells, groundsites, tree holes, crab holes. (2046)	peak at 1700 to 1900 and in village perimeter. plantations and gardens. few in houses and washing places. (2073) more severe in neighboring plantations than in villages. (2124)	confined to coastal areas. no obvious concentration of adults in the vicinity of human habitation. active by day. egg stage = 2 to 6 days. larval stage = 6 to 23 days. pupal stage = 2 days. (2000) confined to coastal areas. (2124)
* <i>Aedes pseudoscutellaris</i>	major vector. (2042) demonstrated carrier of <i>Microfilaria fijiensis</i> (fruit bat) and <i>Dirofilaria immitis</i> (dog). (2000)	bush, prefers calm or slightly moving air. not very active in wind moving more than 3 knots. more numerous in the vicinity of clumps of vegetation or large trees than elsewhere. seems to be widely distributed through unoccupied bush. (2000) frequents vegetation and long grass in the vicinity of human habitation. most common and active in coconut plantations and coastal swamps. (2036)	containers, coconut shells, crab holes, tree holes, bamboo. (2000) prolific breeding in piles of coconut shells. tree holes, crab holes, leaf axils. (2046)	almost exclusively by day and particularly during the 3 hours before sunset and from 0700 to 0900. (2036)	present in both coastal and inland areas. no obvious concentration of adults in the vicinity of human habitation. present in bush up to 10 miles from nearest village. average egg stage = 3.2 days (2 to 6 days), average larval stage = 10.0 days (5 to 24 days), pupal stage = 2 days. (2000) at 24.1°C duration of stages to nearest day were egg = 2, larva = 8, pupa = 2. (2119) inland. (2124) additional sources: 2006, 2033, 2061, 2073.
* Major Vector					

Table 2 cont.

FIJI ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes fijiensis</i>	suspected vector. (2042) demonstrated carrier of <i>Microfilaria fijiensis</i> (fruit bat) and <i>Dirofilaria immitis</i> (dog). (2000)		predominantly in pandanus. some in leaf axils of <i>Alocasia indica</i>. (2042) large axils, tanks, cisterns, major = large pandanus (<i>P. tectorius</i> + <i>P. joskei</i>). minor = leaf axils of taro (<i>Colocasia antiquorum</i> + <i>Alcoasis indica</i>). rain water in axils of large pandanus palms. (2000) leaf axils of <i>Pandanus joskei</i> and <i>Pandanus thurstonii</i>. (2046)	night biter. (2042)	becomes active in open at early dusk. (2000) additional sources: 2006, 2061, 2073.
<i>Aedes aegypti</i>	demonstrated carrier of <i>Dirofilaria immitis</i> (dog). (2000) filial development to tenth day. occasional full development has been demonstrated. (2036)		containers and coconut shells, wells. (2000)		at 24.1°C duration of stages to nearest day were egg = 2, larvae = 11, pupa = 2. (2119) additional sources: 2033, 2046.
<i>Aedes freycinetiae</i>	probable non-vector. (2046)	lives in rain forests and axils of <i>freycinetia pandanus</i>. stays away from houses. (2046)		will not feed on man in captivity. (2046)	

Table 2 cont.

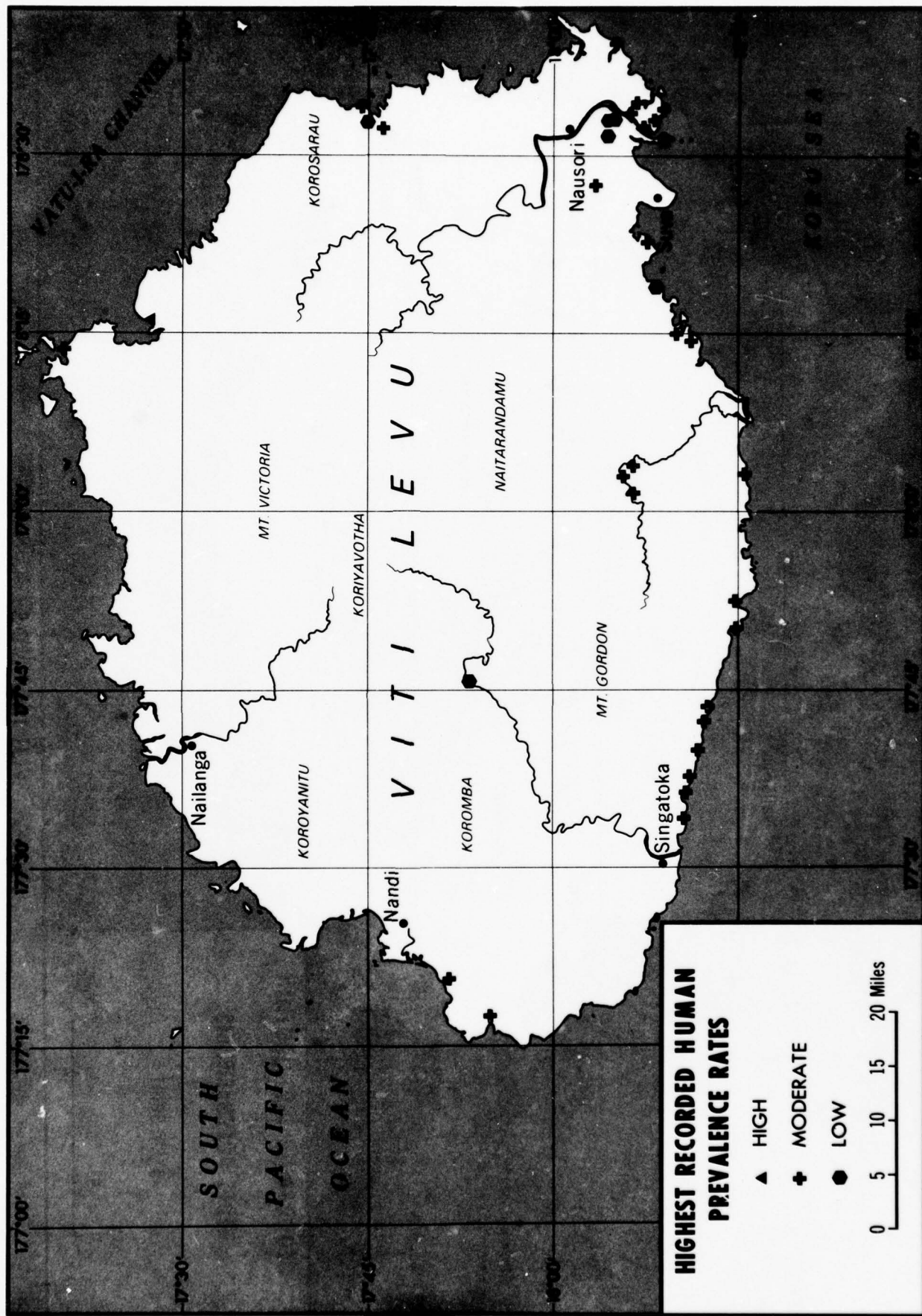
FIJI ISLANDS — MOSQUITO DATA

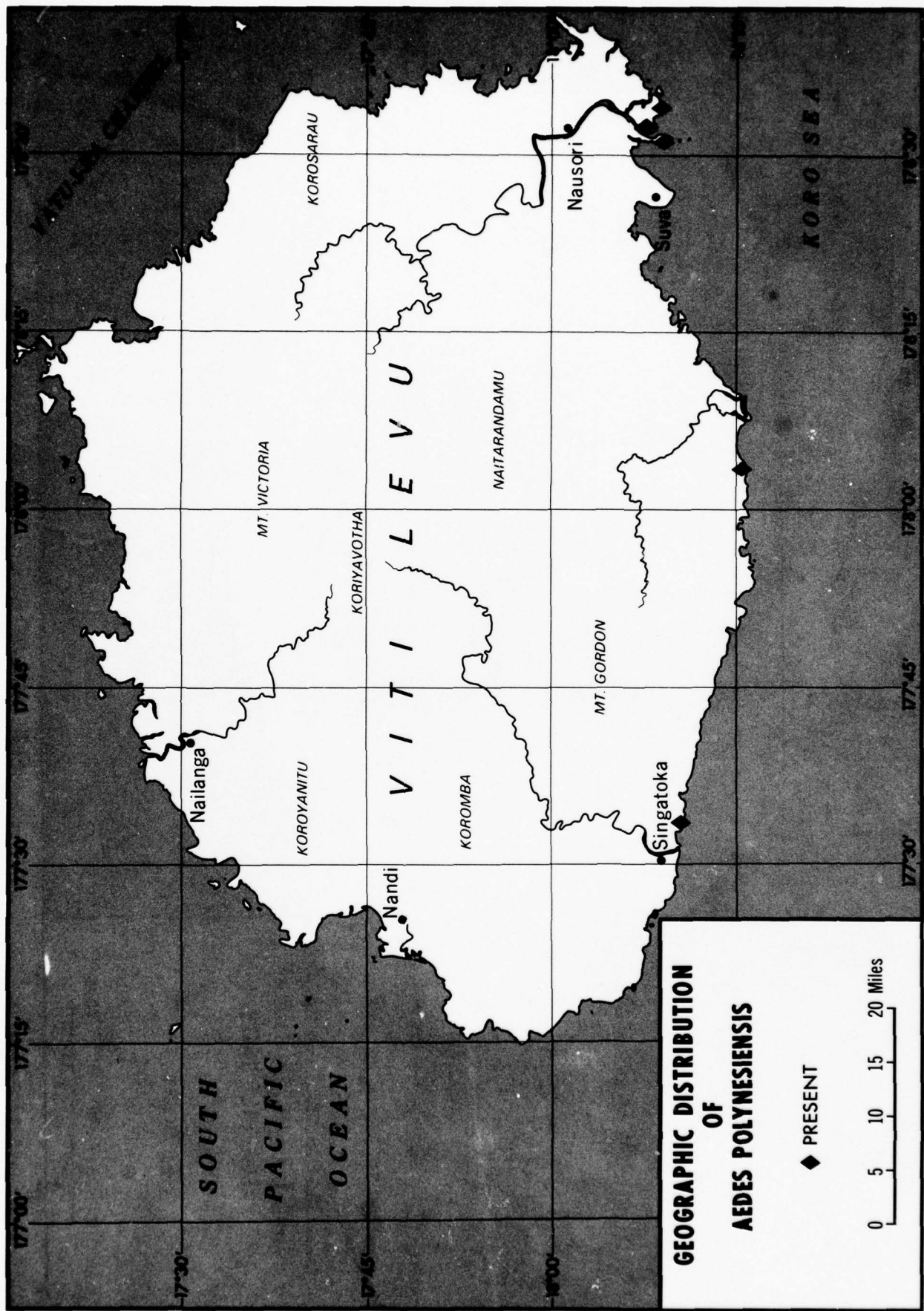
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes horrescens</i>			muddy water in tree holes of forest trees such as screw pine, ivi, breadfruit and tree ferns. (2036)		Taveuni and Viti Levu. (2036)
<i>Aedes rotumae</i>	suspected vector. (2042)		rain water containers, tins, coconut shells. (2042)		
<i>Aedes suvae</i>			crab holes, groundsites, tree holes. (2046)		additional source: 2000.
<i>Aedes vexans</i>	demonstrated carrier of <i>Dirofilaria immitis</i> (dog). (2000)	common in houses. (2000)	ponds, pools, pitted land. (2000) groundsites, crab holes. (2046)		population fluctuates strikingly with rainfall. (2000) additional sources: 2006, 2073.
<i>Aedes vigilax</i>	poor vector. (2046)		brackish water, groundsites, crab holes. (2046)		thought introduced in 1957. serious pest in early 1958, but population nearly destroyed by heavy rains in April, 1958. did not return to eastern (wet) Viti Levu but persists on dry side and on islands of Malolo, Tavua, Yanuga and Makogai. (2046)
<i>Culex annulirostris</i>	demonstrated carrier of <i>Dirofilaria immitis</i> (dog). (2000)	common in houses. peak hour in hut = after 0300. (2000)	crab holes, drains, ponds, pools, pitted land. (2000) groundsites. (2046)		at 24.1°C duration of stages to nearest day were egg = 2, larva = 8, pupa = 2. (2119) additional sources: 2006, 2073.

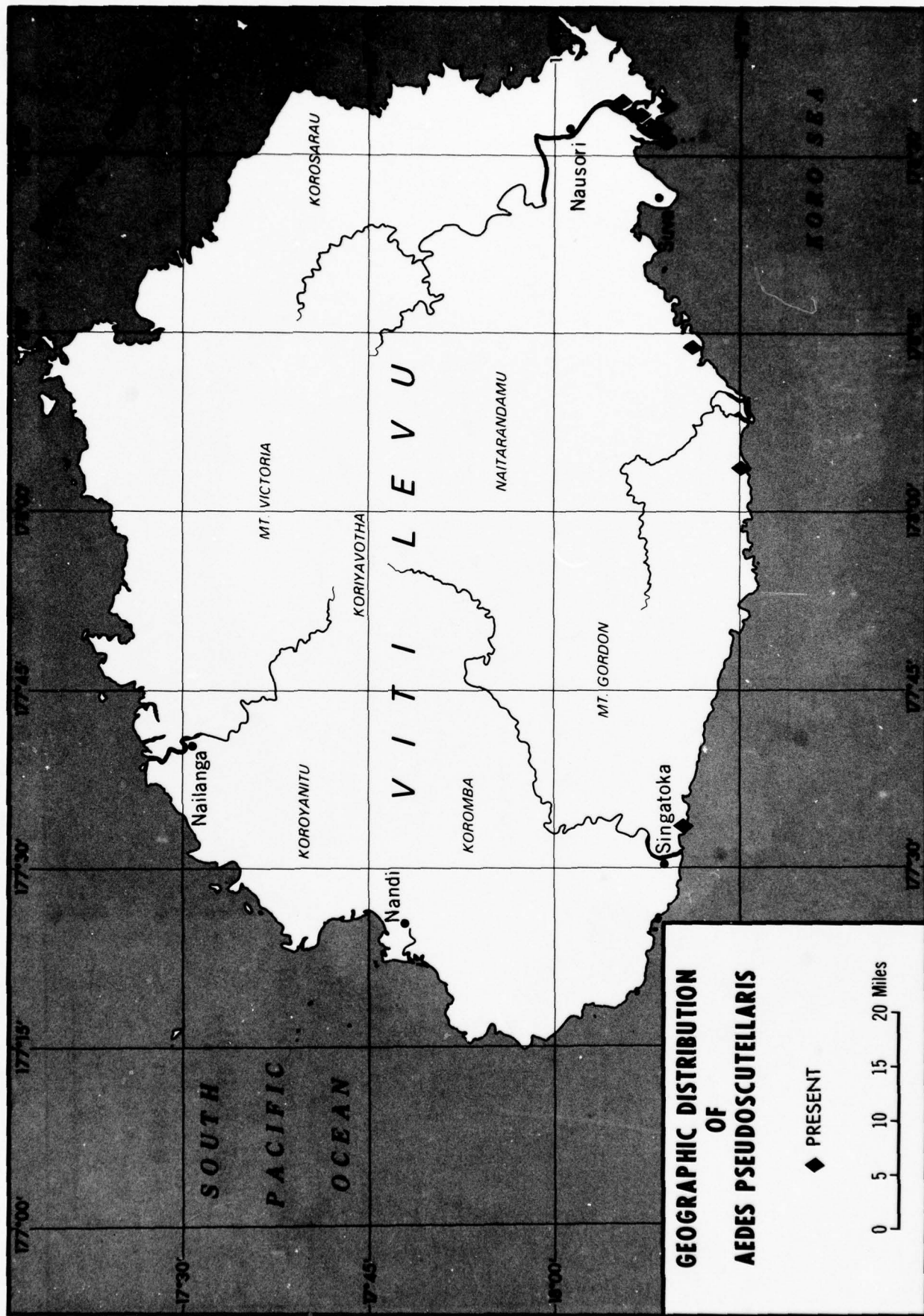
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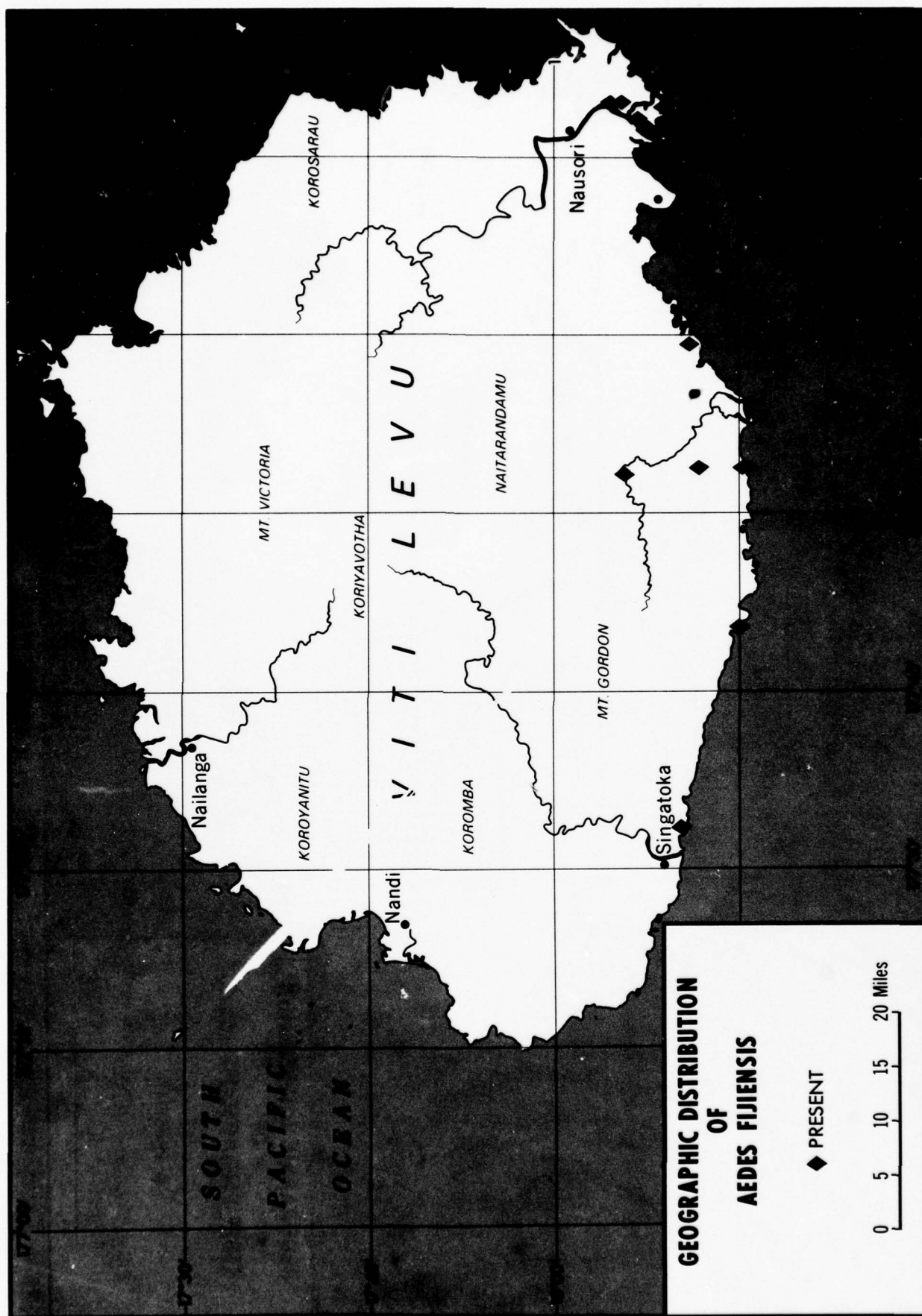
FIJI ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex fatigans</i>	insignificant vector based on lack of evidence of intrafamilial transmission. (2004) demonstrated sufficient vector of nocturnal bancrofti but no infections detected in those caught in native houses. (2036) confirmed as insufficient vector, incompatible with Fijian non-periodic bancrofti. (2036)	common in houses. (2000)	almost any stagnant water surface. containers, coconut shells, crab holes, drains, drums, ponds, pools, pitted land, pit latrines - 4 to 12 feet deep. (2000) groundsites. (2046)		become active in open at early dusk. egg stage = 1 to 2 days, larval stage = 8 to 24 days, mean = 14 days, pupal stage = 2 days. (2000) at 24.1°C duration of stages to nearest day were egg = 2, larva = 13, pupa = 2. (2119) additional sources: 2006, 2042, 2061, 2073.
<i>Culex sitiens</i>			groundsites. (2046)		at 24.1°C duration of stages to nearest day were egg = 2, larvae = 10, pupa = 4. (2119) additional source: 2073.
<i>Taeniorrhynchus purpurata</i>			tree holes, crab holes. (2046)		



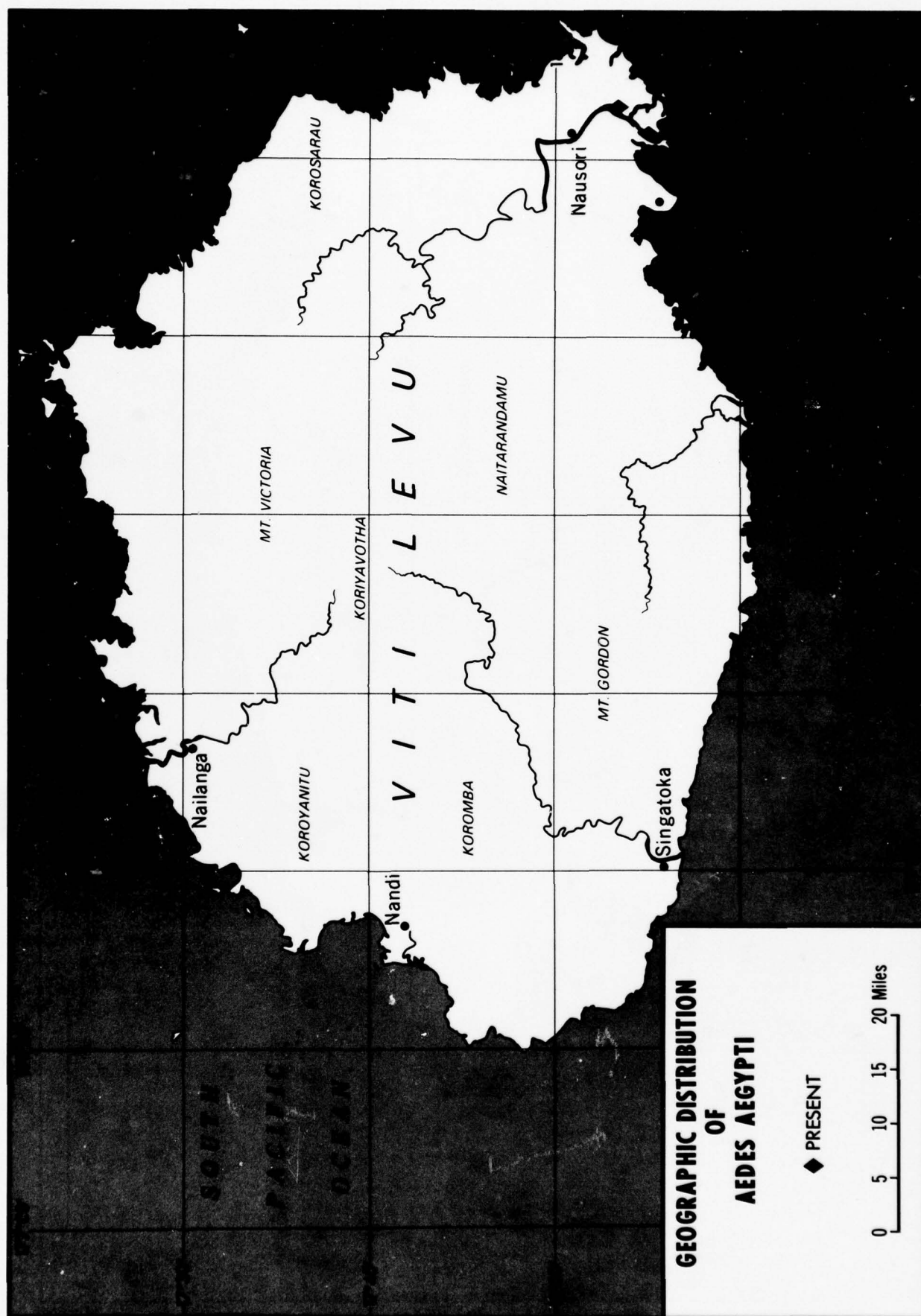


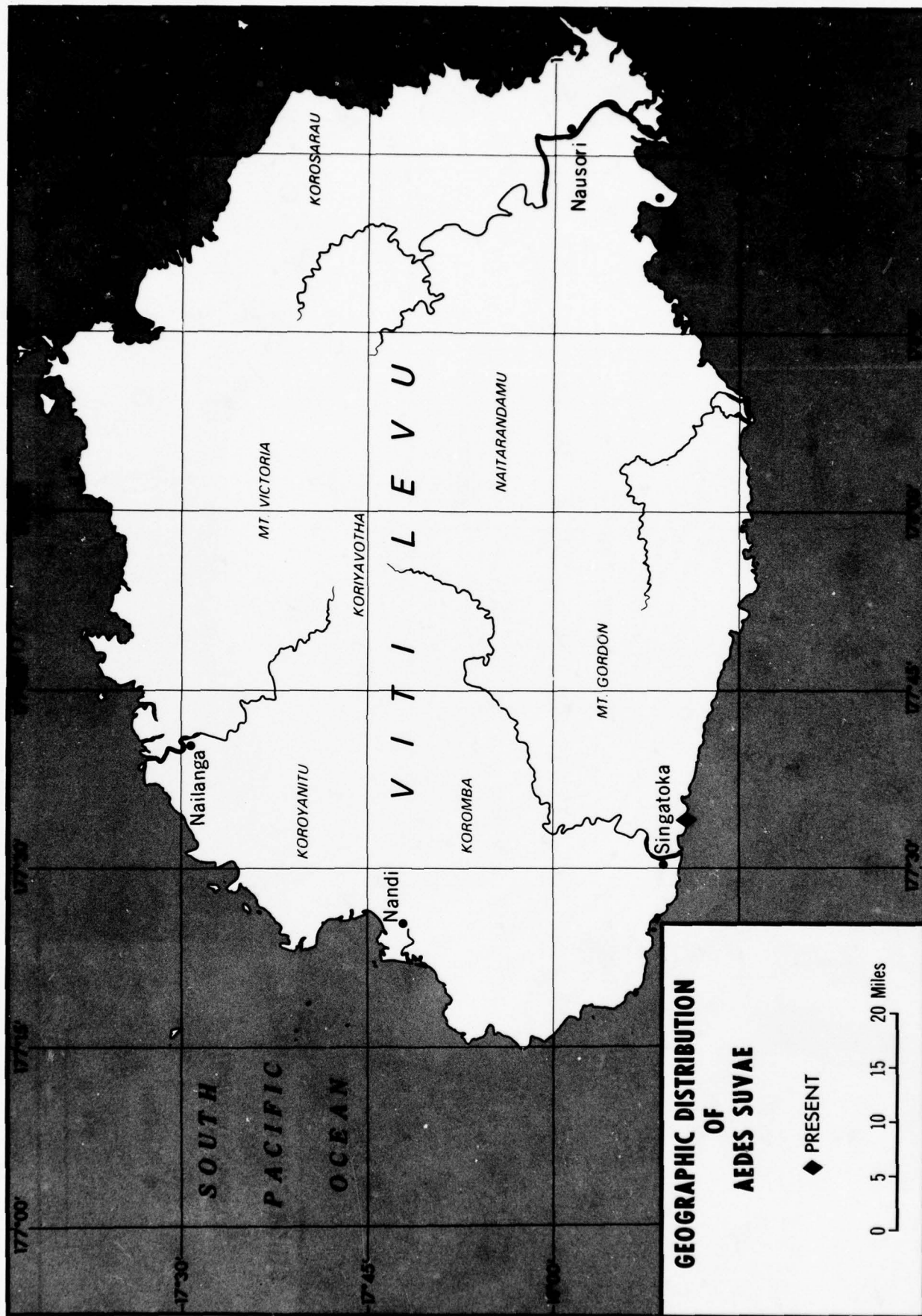


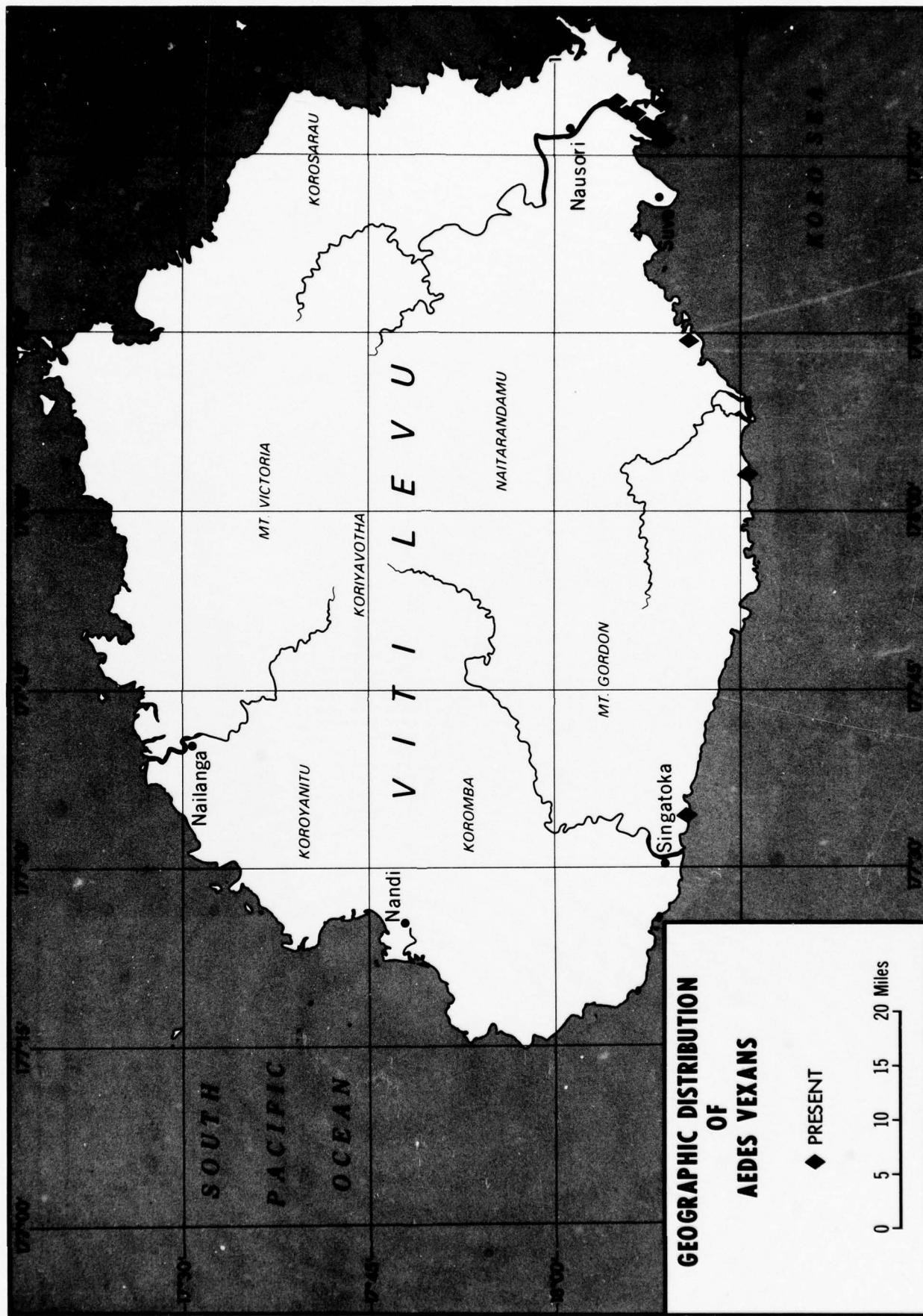


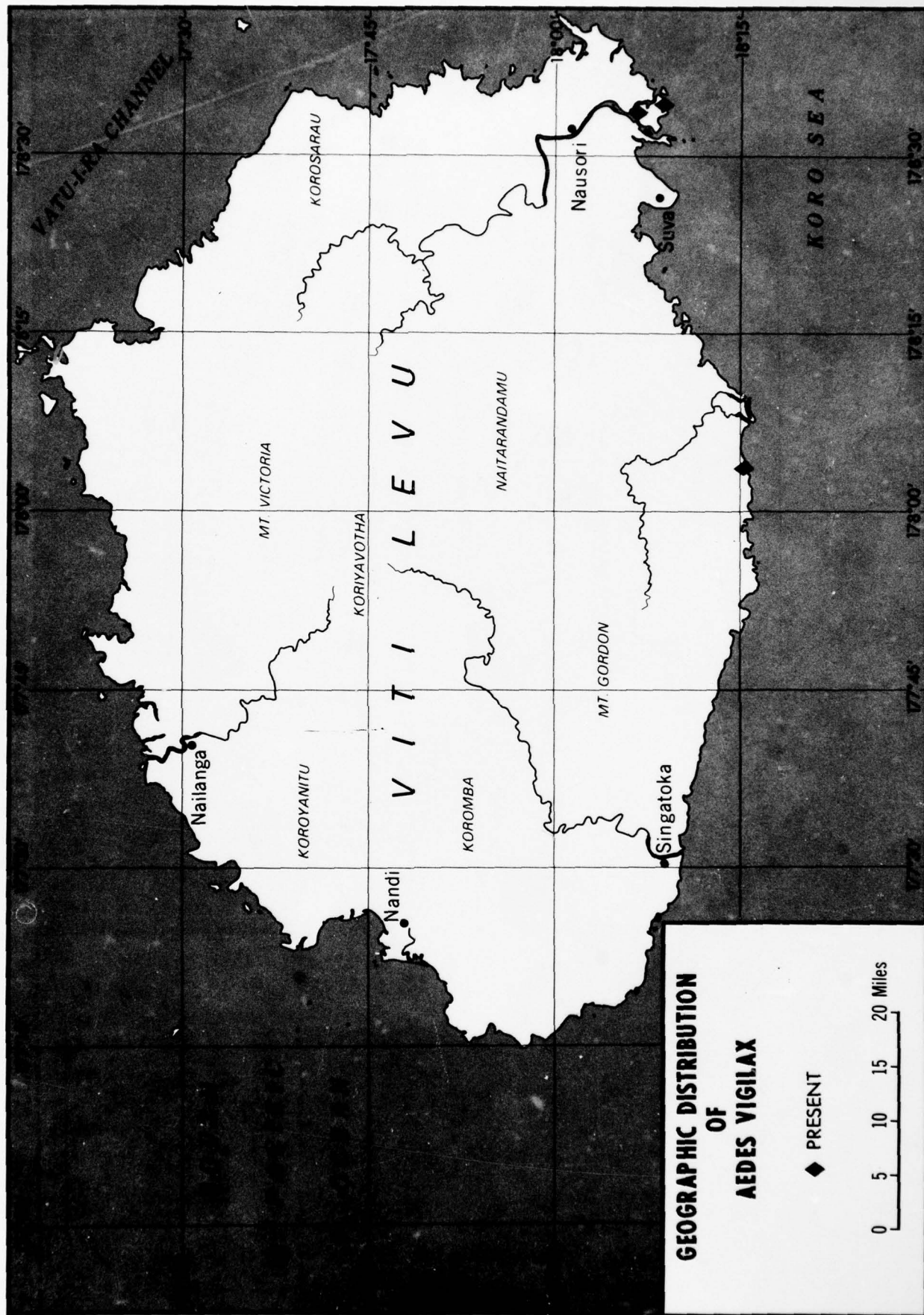
FIJI ISLANDS

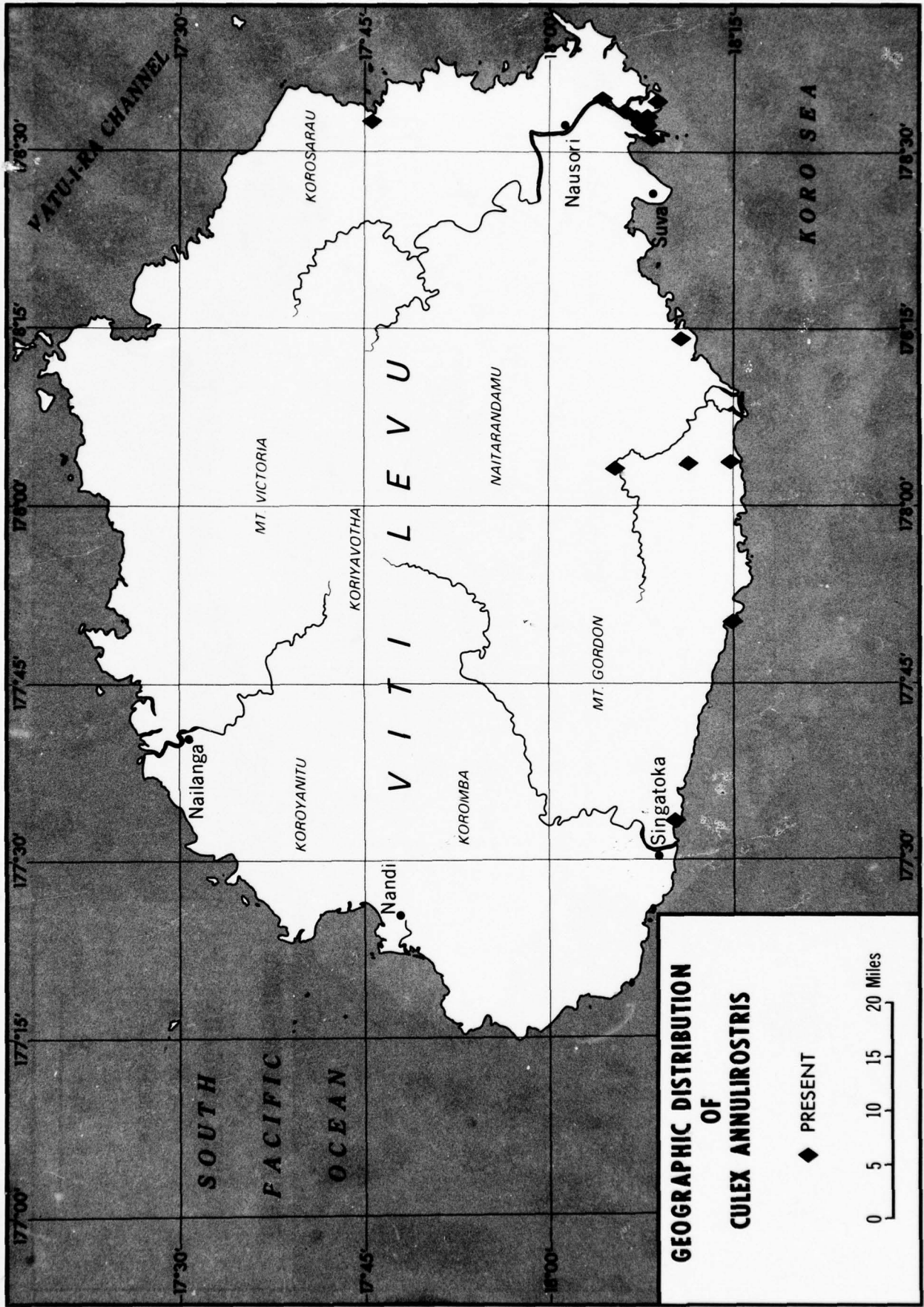
MAP 6

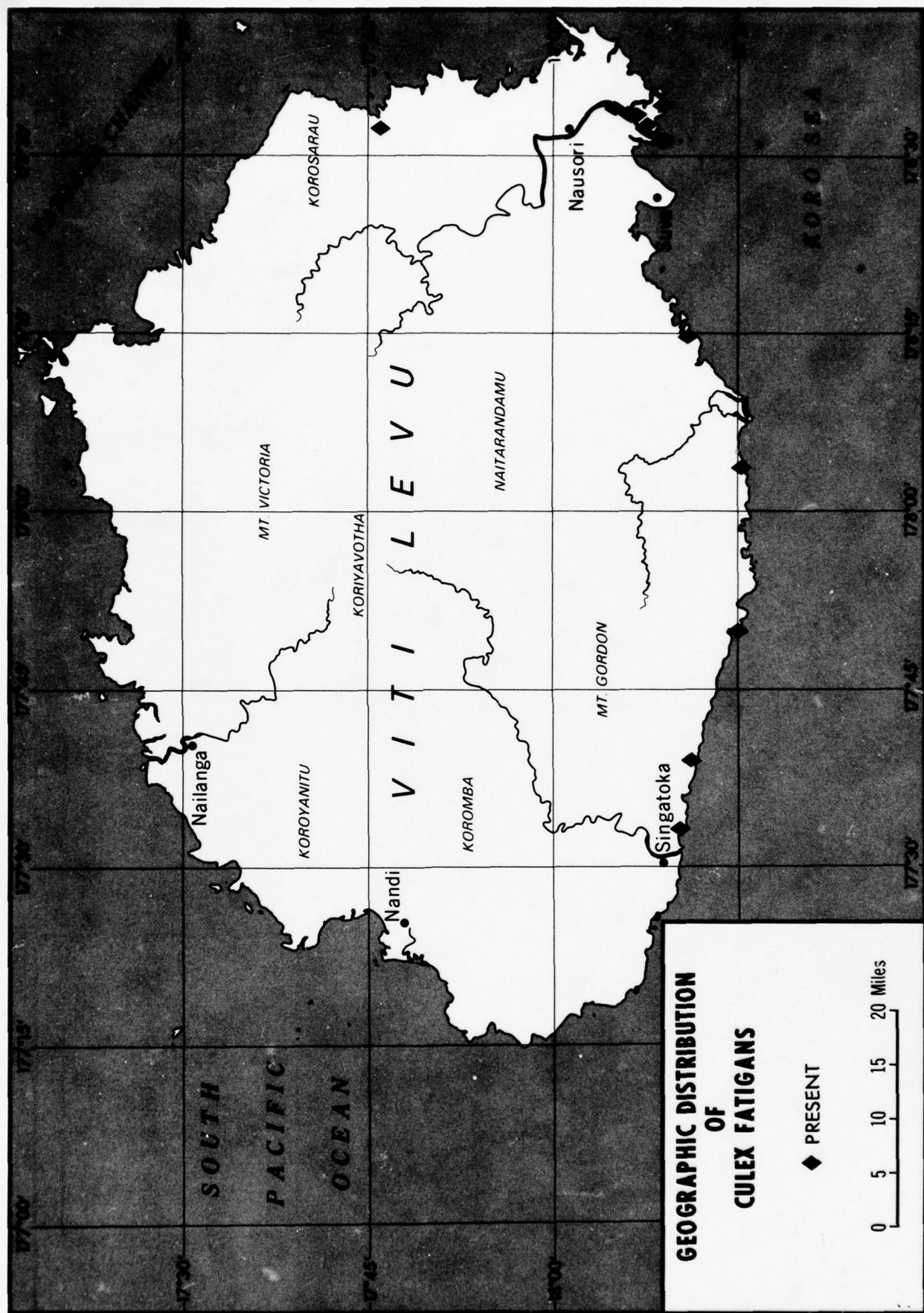


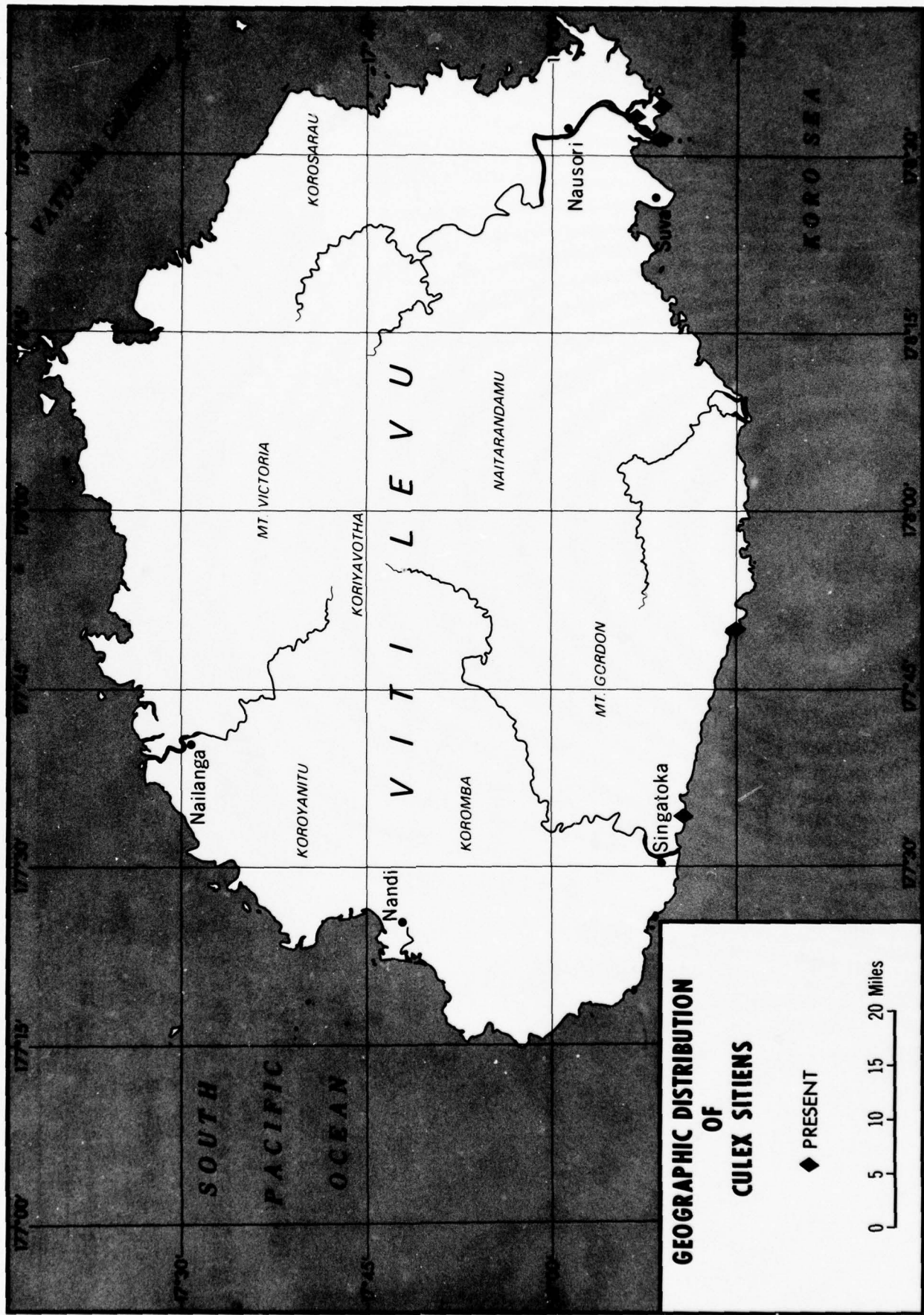


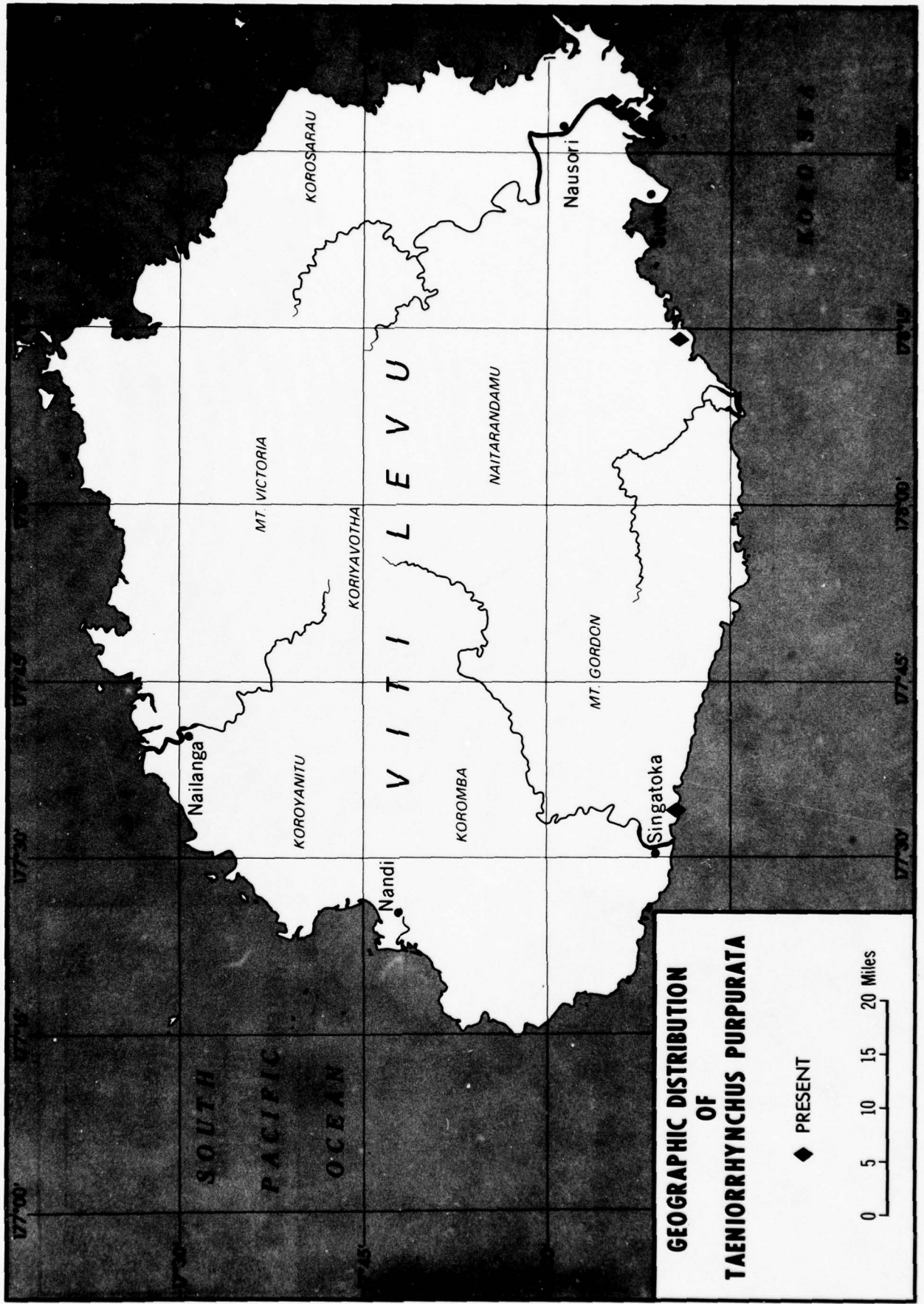


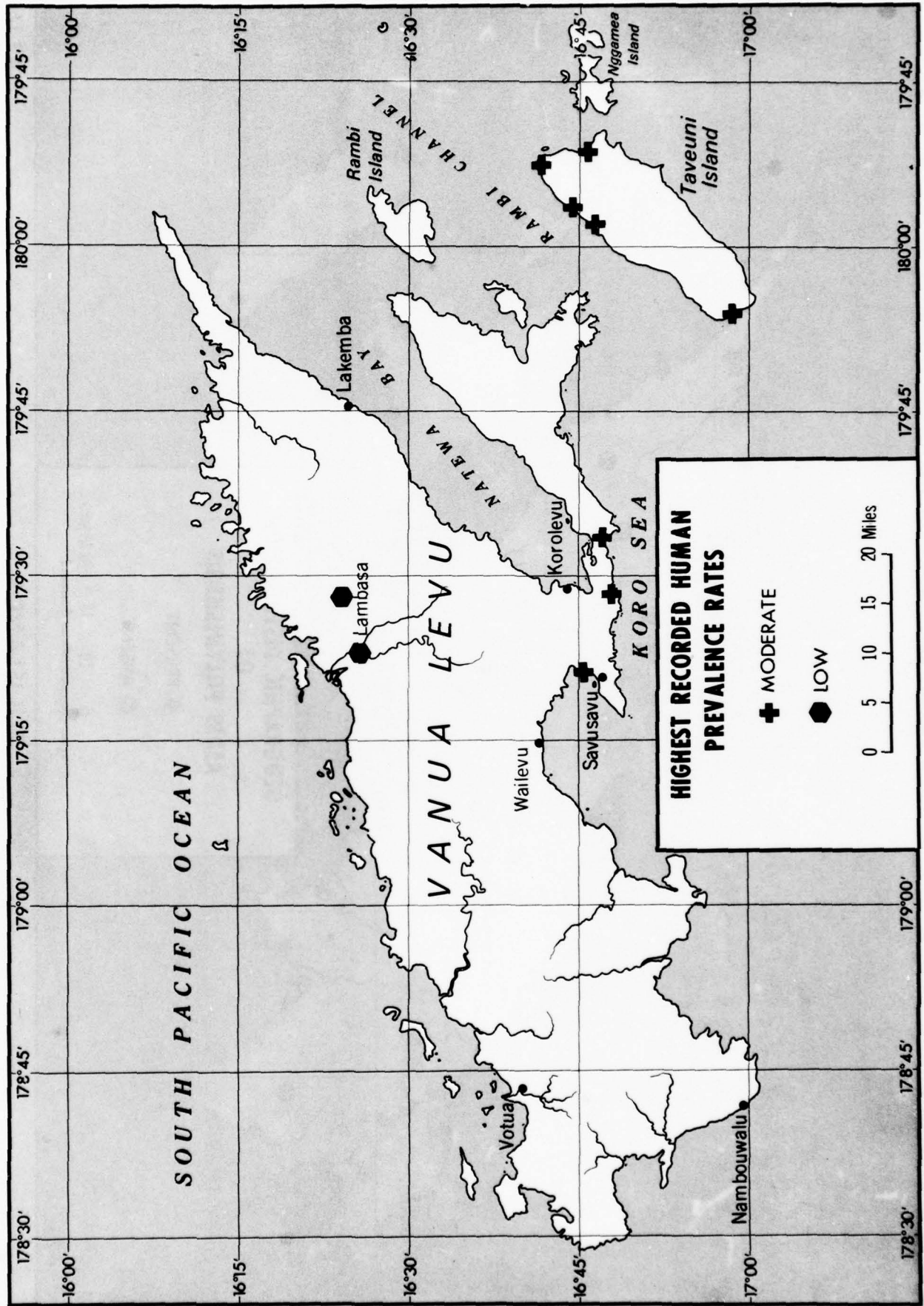


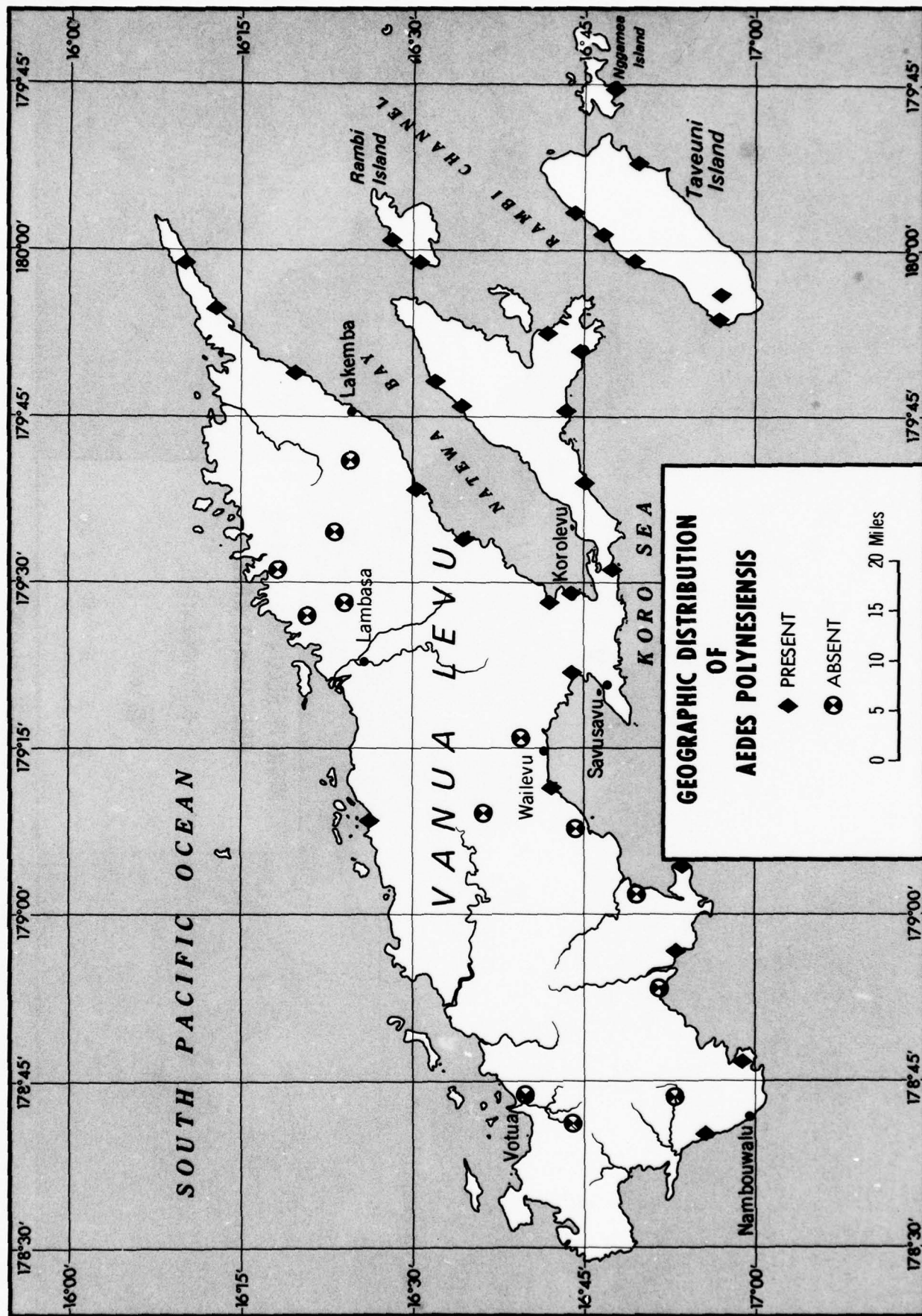


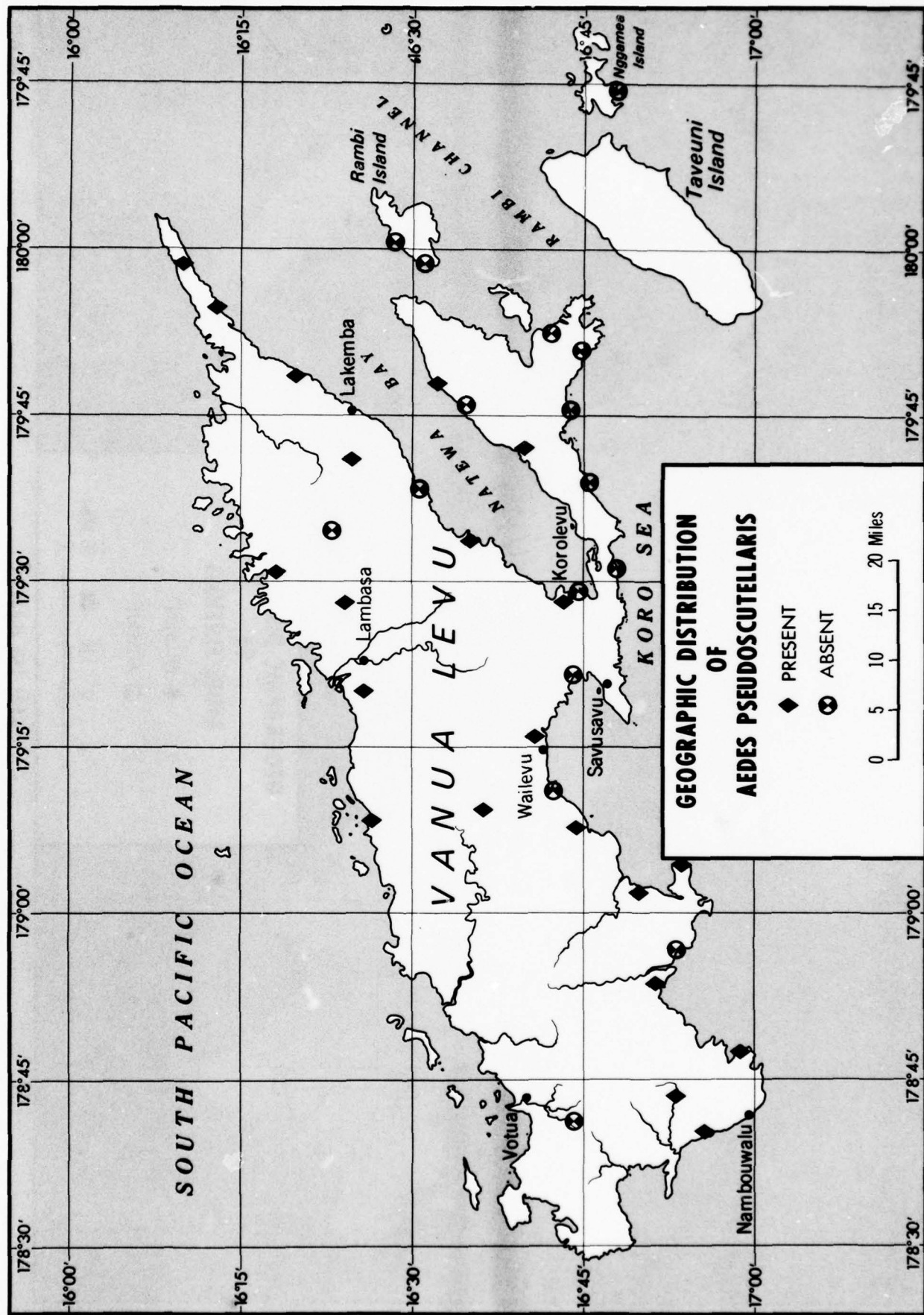


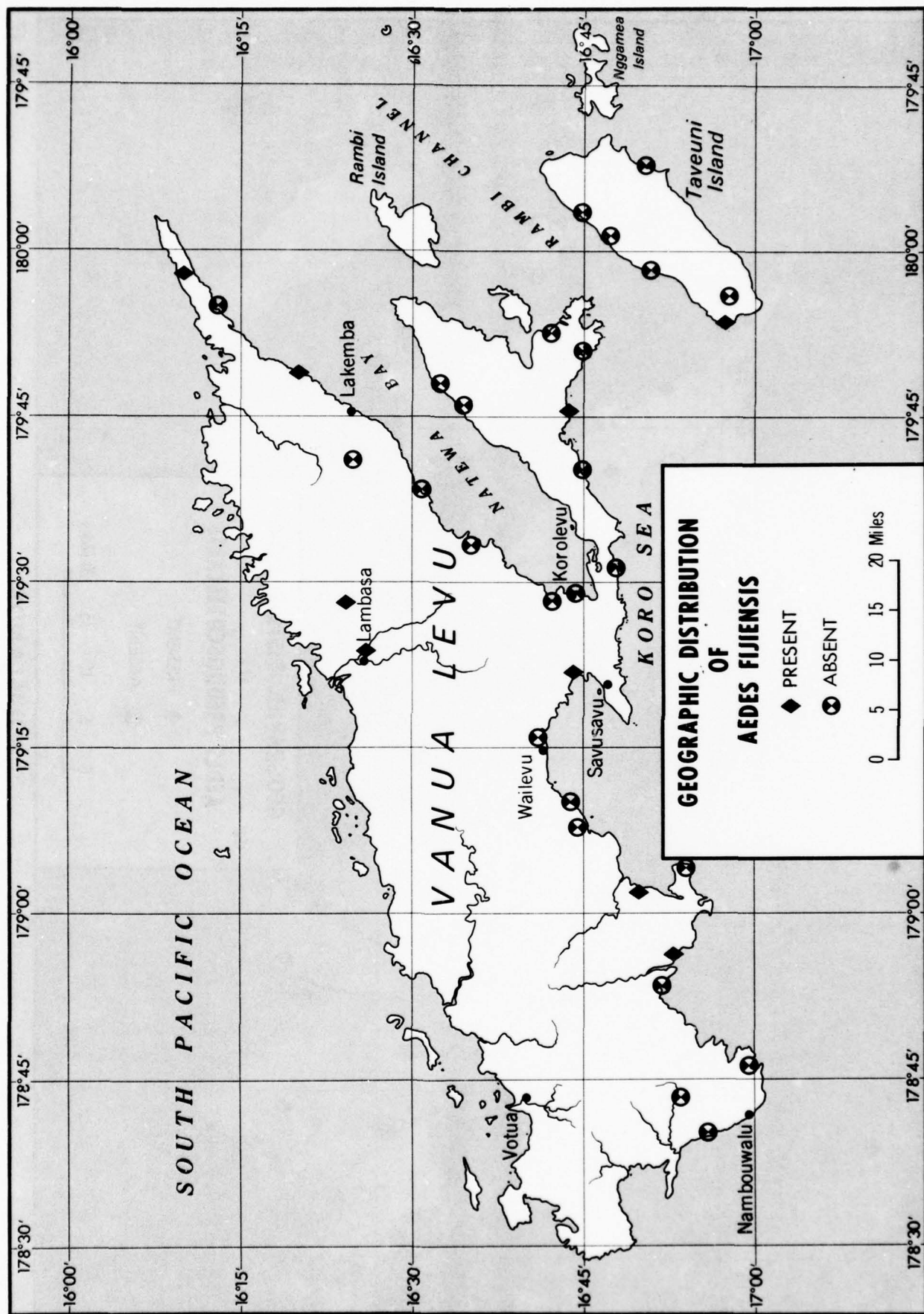


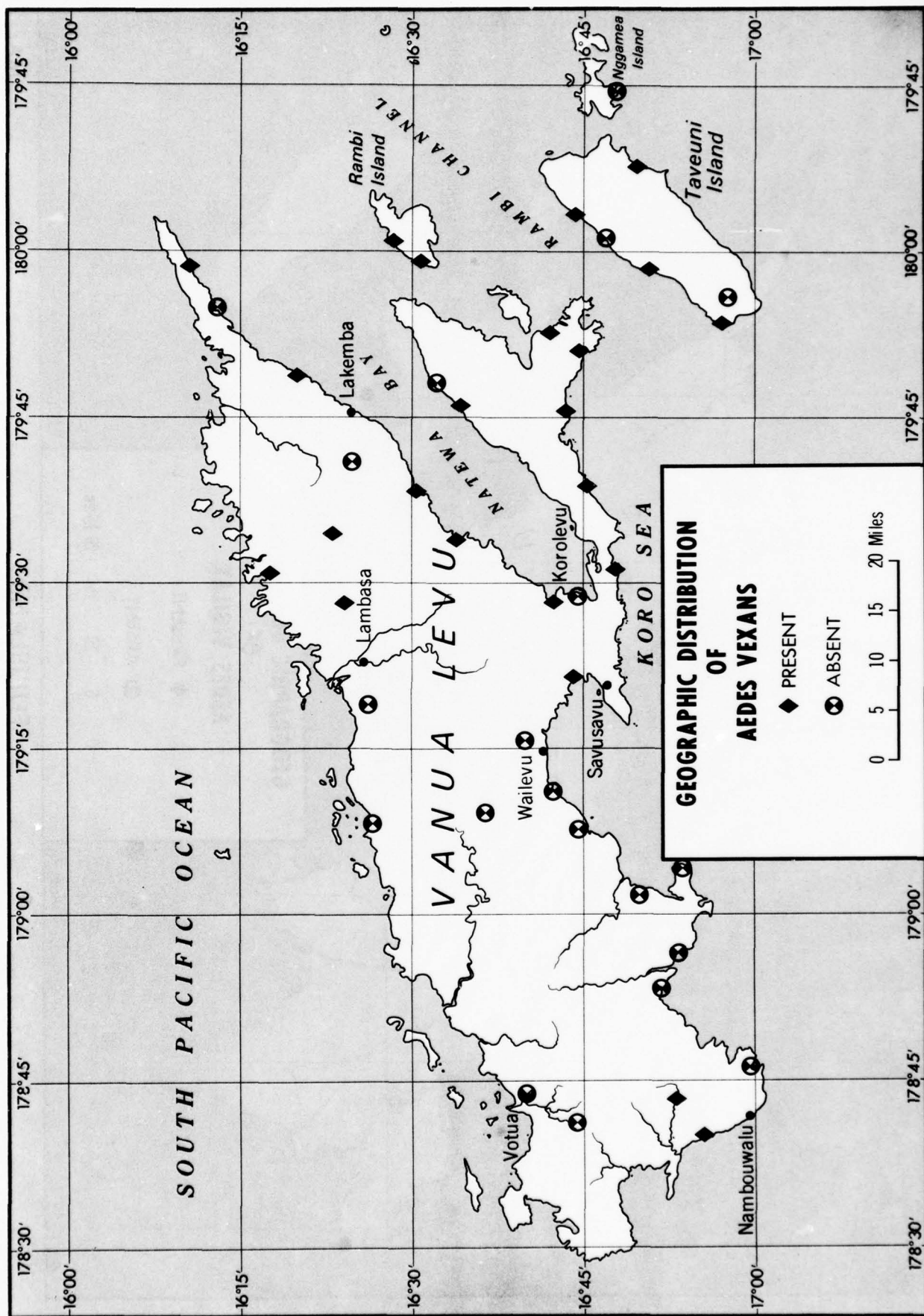


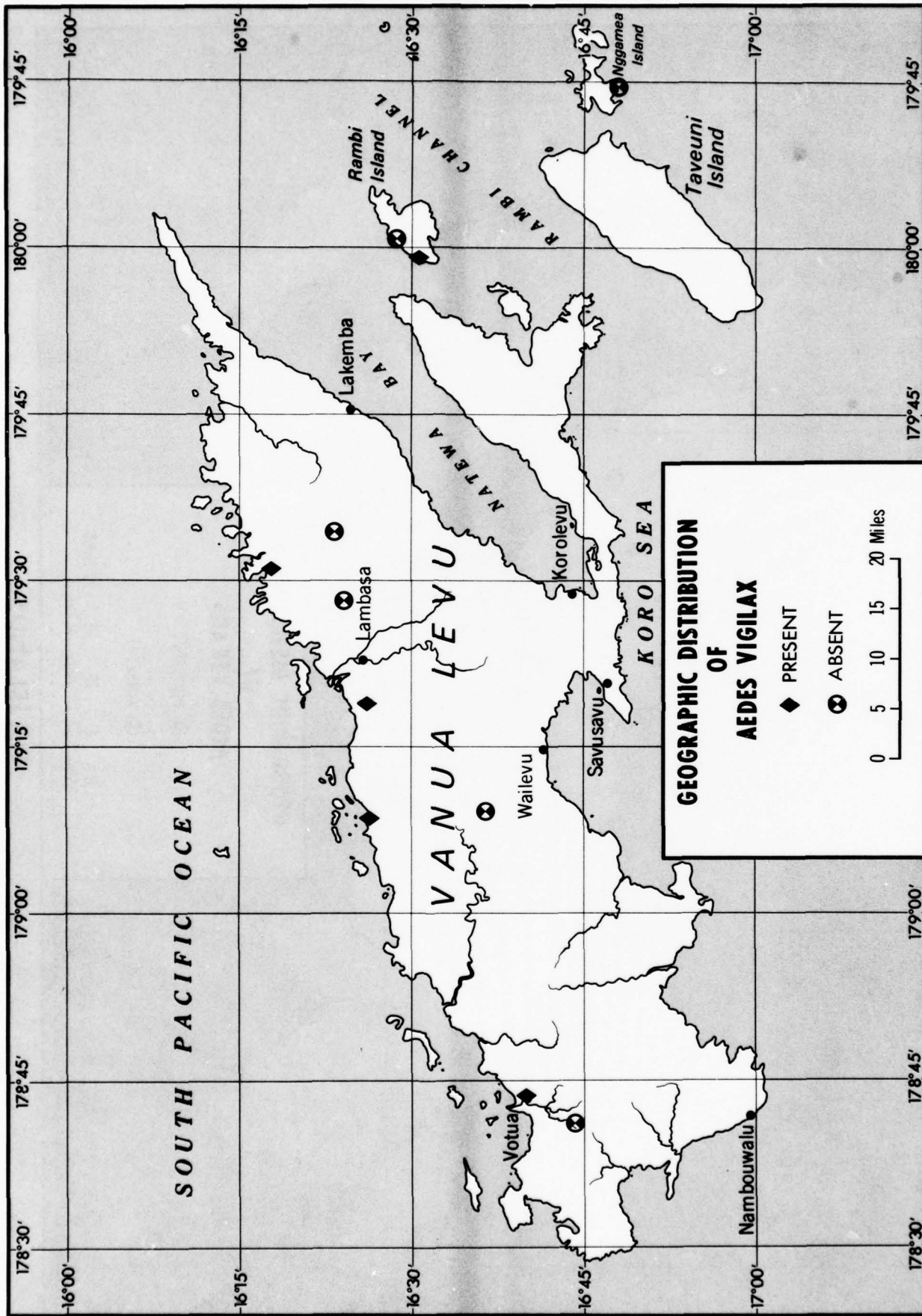


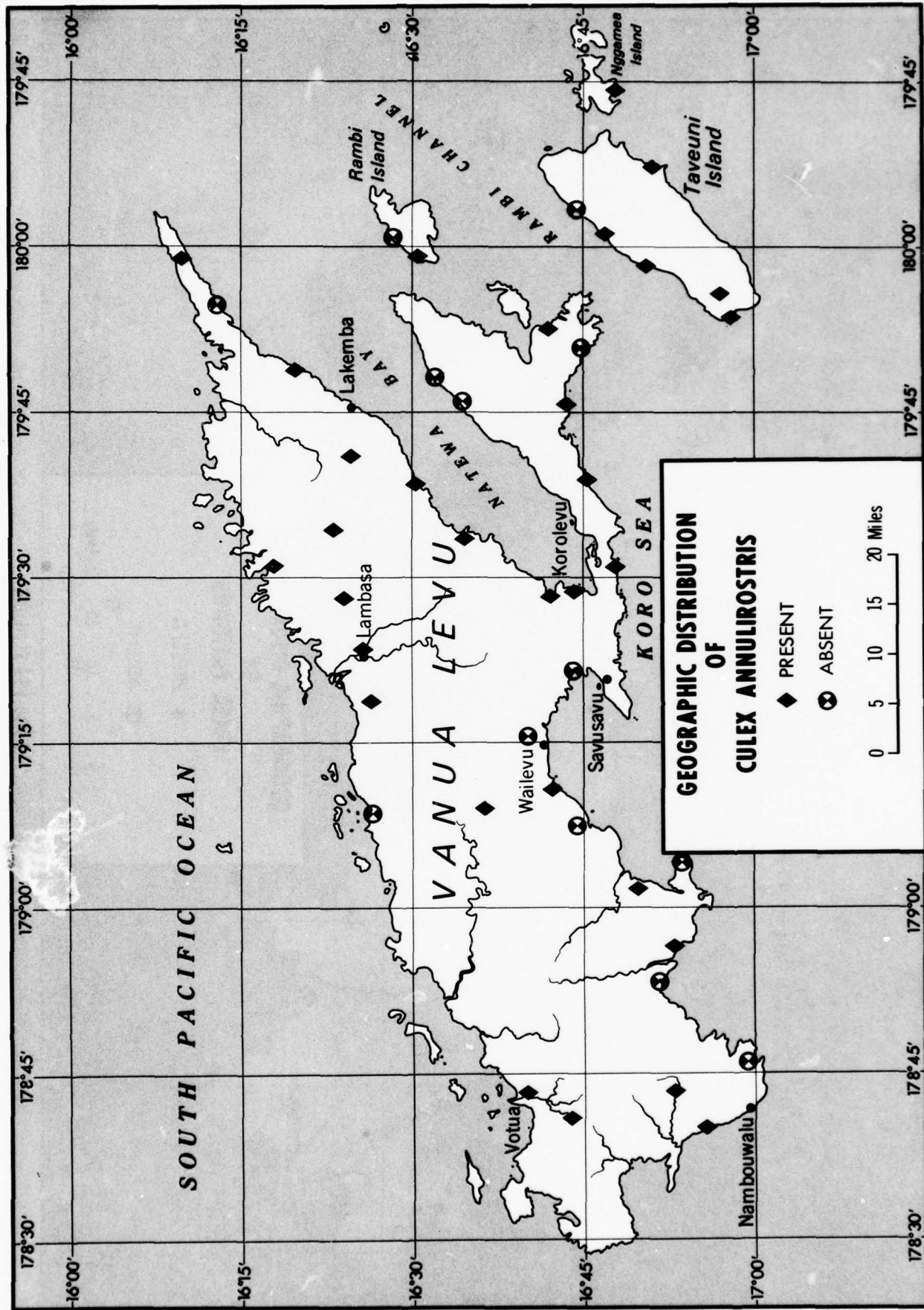


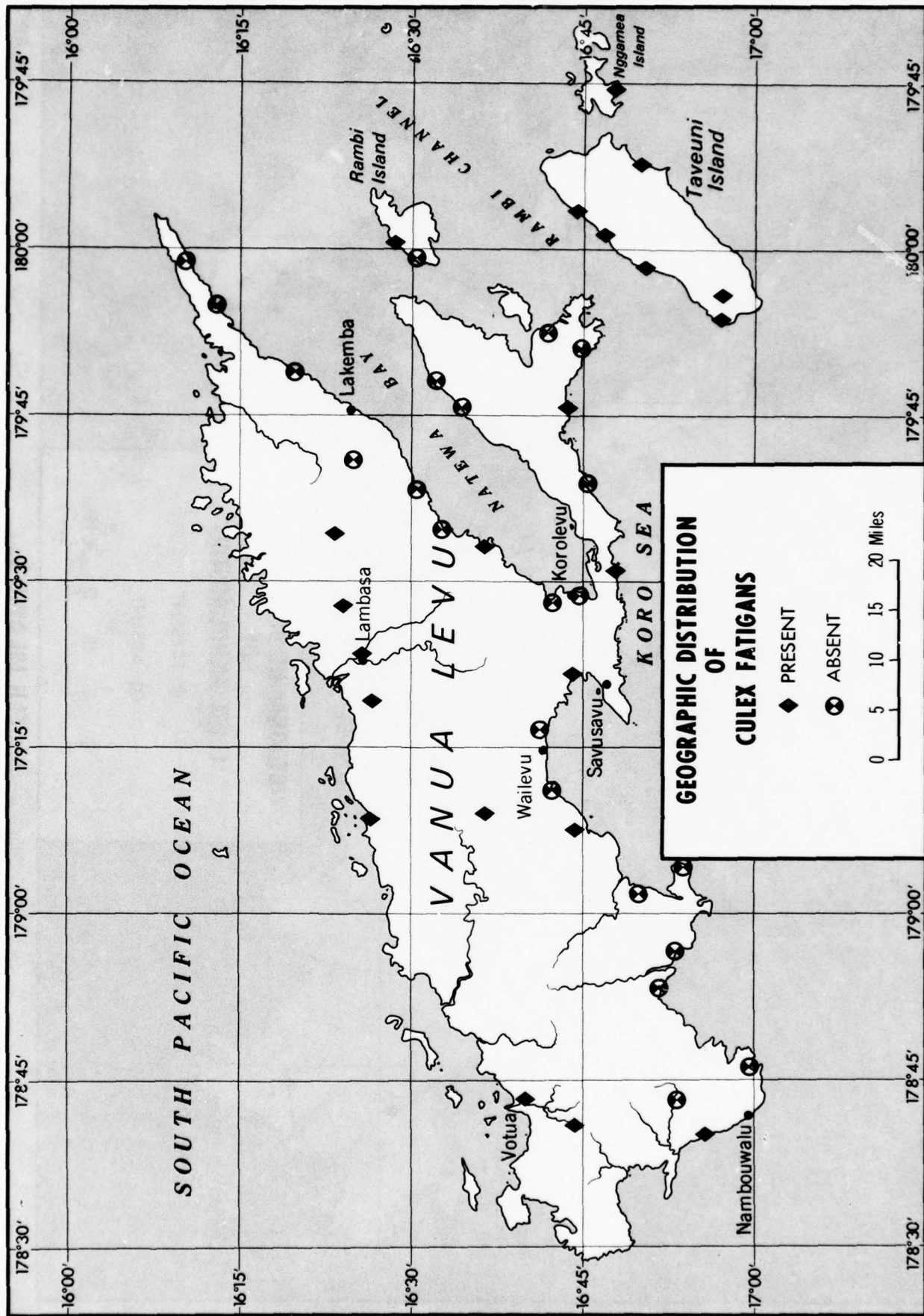


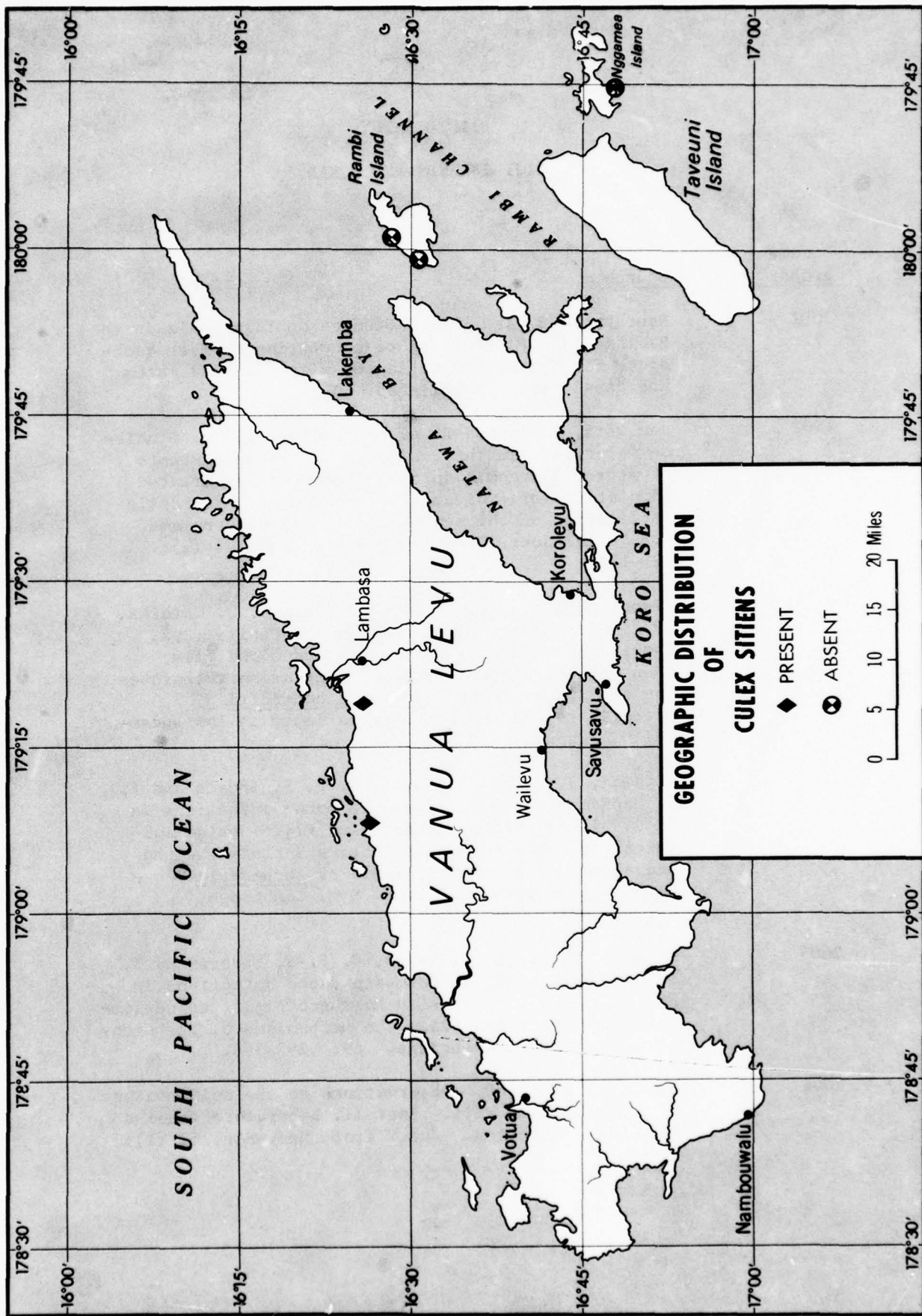












FIJI ISLANDS

BIBLIOGRAPHY

FIJI ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2001	Southgate, B. A. 1971. Studies on filariasis in the Pacific. 1. Field trial of a counting chamber technique for the determination of microfilarial rates and densities. Unpublished. 1-14.
2002	Desowitz, R. S. and B. A. Southgate. 1973. Studies on filariasis in the Pacific: 2. The persistence of micro-filaraemia in diethylcarbamazine treated populations of Fiji and Western Samoa: Diagnostic application of the membrane filtration technique. S.E. Asian Jour. Trop. Med. Publ. Hlth. 4 (2): 179-183.
2003	Desowitz, R. S., B. A. Southgate and J. U. Mataika. 1971. Studies on filariasis in the Pacific. 3. Comparative efficacy of the stained blood film, counting chamber and membrane filtration techniques for the diagnosis of <u>Wuchereria bancrofti</u> microfilaraemia in untreated patients in low endemicity. Unpublished. 1-12.
2004	Mataika, J. U., B. C. Dando, G. F. S. Spears and F. N. MacNamara. 1971. Mosquito borne infections in Fiji. 1. Filariasis in Northern Fiji: epidemiological evidence regarding factors influencing the prevalence of micro-filaraemia of <u>Wuchereria bancrofti</u> infections. Jour. Hyg. Cambridge. 69: 273-286.
2005	Mataika, J. U., B. C. Dando, G. F. S. Spears and F. N. MacNamara. 1971. Mosquito borne infections in Fiji. III. Filariasis in Northern Fiji: epidemiological evidence regarding the mechanisms of pathogenesis. Jour. Hyg. Cambridge. 69: 297-306.
2006	Symes, C. B. 1960. Observations on the epidemiology of filariasis in Fiji. Part II. Laboratory studies and human infection. Jour. Trop. Med. Hyg. 63 (1): 31-44.

- 2030 Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
- 2031 Nelson, S. and J. M. Cruikshank. 1956. Filariasis in Fiji. Abstracts from a report. Unpublished. 1-4.
- 2036 Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326
- 2038 Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
- 2042 World Health Organization Regional Office for the Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report.. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
- 2046 Burnett, G. F. 1960. Filariasis research in Fiji 1957-1959. Unpublished. 1-159
- 2061 Burnett, G. F. and J. U. Mataika. 1961. Mass administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis. Trans. Roy. Soc. Trop. Med. Hyg. 55 (2): 178-187.
- 2062 Burnett, G. F. and J. U. Mataika. 1964. Mass administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis. II. Results of a blood survey made four years after drug administration. Trans. Roy. Soc. Trop. Med. Hyg. 58 (6): 545-551.
- 2073 Mataika, J. U., B. C. Bando and F. N. MacNamara. 1970. Filariasis and arbovirus survey. Northern Fiji. 1968-1969. Report to the director of medical services, Fiji. Unpublished. 1-79.
- 2089 Brunwin, A. D. 1909. Some aspects of filariasis in Fiji. Jour. Trop. Med. Hyg. 12 (24): 365-370.
- 2091 Schlosser, Ralph J. 1945. Observations on the incidence of Wuchereria bancrofti larvae in the native population of the Solomon Islands area. American Journal of Tropical Medicine. 25: 493-495.

2124

Mataika, J. U. and V. Cagimaivei. 1974. Country report,
Fiji Islands. Wld. Hlth. Org. Monogr. Ser. 1-13.

BIBLIOGRAPHY

FIJI ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2000	Symes, C. B. 1960. Observations on the epidemiology of filariasis in Fiji. Jour. Trop. Med. Hyg. 63 (1): 1-14.
2004	Mataika, J. U., B. C. Dando, G. F. S. Spears and F. N. MacNamara. 1971. Mosquito borne infections in Fiji. 1. Filariasis in Northern Fiji: epidemiological evidence regarding factors influencing the prevalence of micro-filaraemia of <u>Wuchereria bancrofti</u> infections. Jour. Hyg. Cambridge. 69: 273-286.
2006	Symes, C. B. 1960. Observations on the epidemiology of filariasis in Fiji. Part II. Laboratory studies and human infection. Jour. Trop. Med. Hyg. 63 (1): 31-44.
2033	Rosen, Leon. 1955. Observations on the epidemiology of human filariasis in French Oceania. Amer. Jour. Hyg. 61 (2): 219-248.
2036	Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.
2038	Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2046	Burnett, G. F. 1960. Filariasis research in Fiji 1957-1959. Unpublished. 1-159.
2061	Burnett, G. F. and J. U. Mataika. 1961. Mass administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis. Trans. Roy. Soc. Trop. Med. Hyg. 55 (2): 178-187.

- 2073 Mataika, J. U., B. C. Dando and F. N. MacNamara. 1970. Filariasis and arbovirus survey. Northern Fiji. 1968-1969. Report to the director of medical services, Fiji. Unpublished. 1-79.
- 2119 Lever, J. A. W. 1943. Some common mosquitoes of the Suva area. Agricultural Journal of Fiji. 14: 101-102.
- 2124 Mataika, J. U. and V. Cagimaivei. 1974. Country report, Fiji Islands. Wld. Hlth. Org. Monogr. Ser. 1-13.
- 2134 Advisory Team. 1973. Quarterly report of the WHO inter-country filariasis advisory team. Third quarter, 1973 Unpublished. 1-2.

C. Western Samoa

1. Human Data

Treatment and control measures were first introduced in 1964 with major efforts in 1965 and 1966. The last recorded effort in treatment was in 1971. Most detailed information was available for the island of Upolu. The highest prevalence rates recorded in the Disease Information System were in the moderate (10.0 to 49.9%) range. (Map 24) After treatment and control measures were introduced, the prevalence rates dropped to less than 5%. (Table 3)

2. Mosquito Data

Information on the role and bionomics is presented in Table 4. Information on the geographic distribution of the various mosquito species is presented in Maps 25-30.

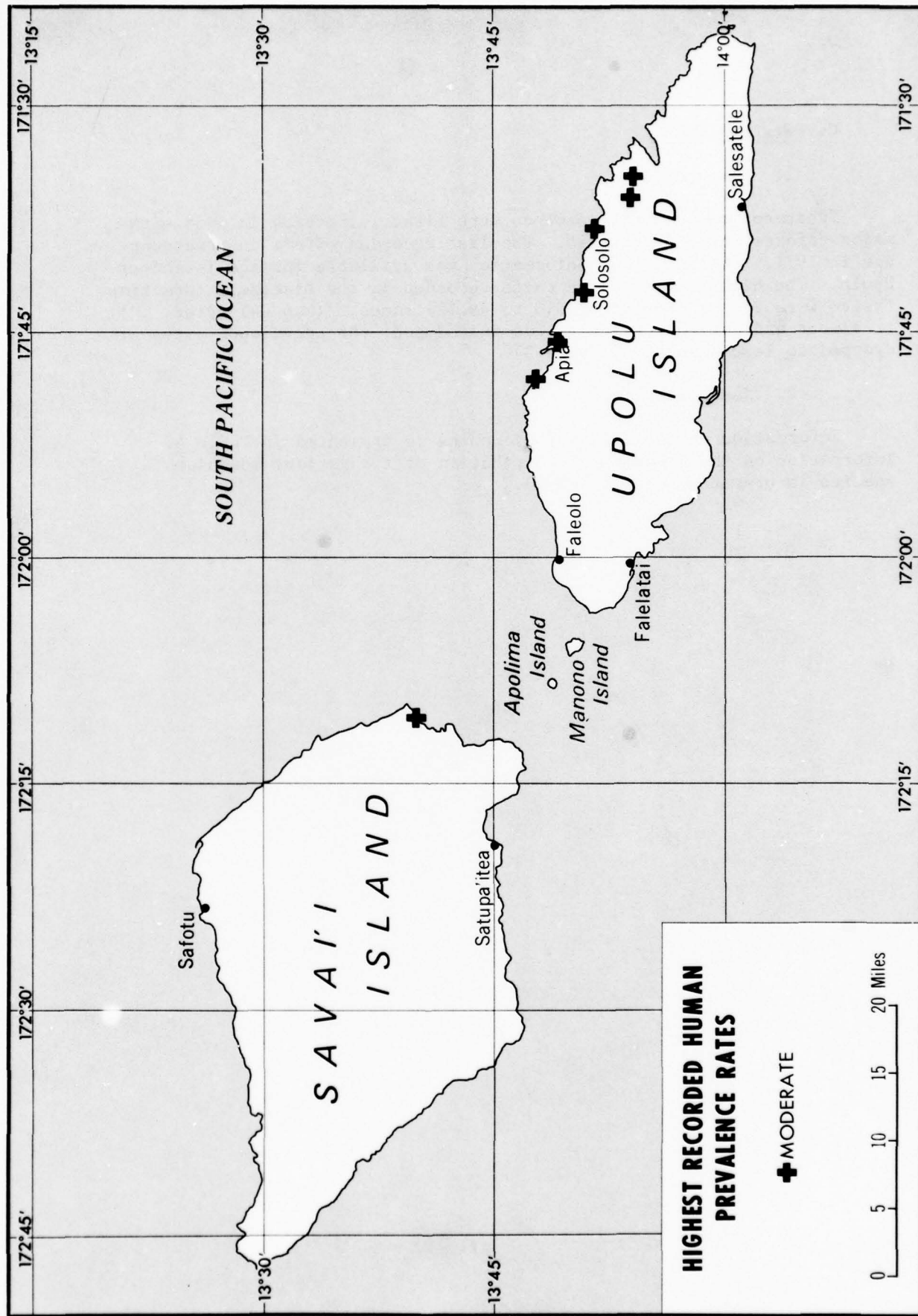


Table 3

WESTERN SAMOA — MOST RECENT PREVALENCE RATES

LOCATION	DATE	MATERIAL	METHOD	PREVALENCE	TREATMENT INFORMATION
WESTERN SAMOA (2024) (2125)	1973	venous blood	1.0 ml. filtration	24.7%	last treated in 1971.
	1973			0.1%	treatment started in 1965. second round 1970 to 1971.
SAVA'I'I Satufa'itea (2042)	1964	capillary blood	20 cmm smear	0.6%	3 to 15 months post treatment
UPOLU Lefaga (2042) Falevao (2126) Lalomauga (2126) Solosolo (2126) Toamua (2126)	1966	capillary blood	20 cmm smear	1.8%	3 to 15 months post treatment
	1966	capillary blood	20 cmm smear — giemsa stain	2.4%	20 months post treatment
	1966	capillary blood	20 cmm smear — giemsa stain	4.4%	20 months post treatment
	1966	capillary blood	20 cmm smear — giemsa stain	3.6%	20 months post treatment
	1966	capillary blood	20 cmm smear —	2.4%	20 months post treatment

Table 4

WESTERN SAMOA — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	non-periodic vector. (2036) main vector. (2136)	does not rest in houses. (2126) verandah of school building, Samoan "fale," outside on grassy ground under a tree. resting - present in shaded areas, absent in unshaded areas. (2128)	tree holes, rock holes, crab holes, coconut shells, large and small artificial containers, pandanus leaf axils, banana stumps, ground pools, cacao pods. (2020) tree holes, unused toilet, druti. (2127) tree holes, rock holes drums, motor tires, coconut shells, tin cans, bowl, unused toilet. (2128) motor car tire, drums, tree holes, breeding in leaf axils of pandanus was confirmed. main breeding species in tree holes. larvae present in crab holes. breeding in canoes rather rare but where present is very high. (2129)	significantly greater biting densities outdoors than indoors. larger numbers collected at night, increasing on moonlit nights. evening peak greater than morning peak. (2100) morning peak 0800 to 0830, afternoon peak 1700 to 1830. no clear relationship between biting activity and temperature and relative humidity. (2100) most active between 0700 to 1000 and 1500 to 1900. (2126) usually known as day biter but caught quite frequently at night. (2129)	density peaks app. 2 weeks after heavy rainfall. (2100) possibly greater vector efficiency than <i>Aedes samoanus</i> . (2101) domestic demands for wood, clear village areas decreasing breeding sites. (2010) prevalent throughout the country. (2126) two peaks of activity -- one = 0600 to 1000 with highest peak at 0800. second = 1500 to 1800 with highest peak between 1700 and 1800. (2129) additional source: 2024.
* Major Vector			50		

Table 4 cont.

WESTERN SAMOA — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes pseudoscutellaris</i>	major vector. (2086)	rests in grass vines under brush beneath houses near breeding place. (2086)	any small water collection except ground puddles. (2086)	throughout the day in any area with peaks in the shade and at dawn and dusk. night biter. (2086)	wind shifted the distribution of infected mosquitoes to the leeward side of each village. (2086)
* <i>Aedes samoanus</i>	very important vector. (2015) major vector. (2042)	primarily outdoor resters. truly forest or bush mosquito. present in some villages where the virgin forest borders the village. (2020) found resting in houses at night and in early morning. (2042) no correlation with temperature or relative humidity. some possible relation to rainfall. no density differences in indoor or outdoor collections. (2100) verandah of school building, Samoan "fale," outside on grassy ground under a tree. (2128)	leaf axils of freycinetia species and pandanus. (2020) leaf axils of freycinetia and common pandanus. (2042) pandanus. (2126) pandanus trees. (2128) motor car tires, drums, pandanus, freycinetia. larvae present in every village of Upolu in leaf axils of pandanus. larvae present only in eastern and southern parts of Savai'i in leaf axils of pandanus. breeds more abundantly in higher axils than in lower ones. breeds more in inland areas than in coastal areas. inland areas slightly elevated. only larvae present in freycinetia. (2129)	nocturnal peak at 2300. feeds readily on man. bites by day. (2020) night biter with peak at 2300. (2042) peak from midnight to 0330. no correlation with temperature or relative humidity. some possible relation to rainfall. (2100) night biter. (2086) night biter. (2126) night biter. (2129)	exceedingly abundant nocturnal species in interior villages and in some coastal villages closely surrounded by bush. transmission occurs in open village. (2020) seasonal variation correlates mostly with rainfall. (2100) restricted to certain villages. rarely present in urbanized areas. (2126) seasonal peak density = May. seasonal low density = September. density seems to be correlative to the amount of rainfall in a whole month period from 2 months before to 1 month before survey. (2128) population density highest between 2100 and 0400 with highest peak between 2400 and 0300. (2129)
* Major Vector			51		

Table 4 cont.

WESTERN SAMOA — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes upolensis</i>	minor vector. (2042)	bush. (2015) truly forest or bush mosquito. occurs in some villages where the virgin forest borders the village. (2020) forest species. present in dense vegetation. (2126)	fallen tree stumps, fern tree stumps in deep forest. (2042)	feeds readily on man. bites by day. (2020)	restricted in distribution and abundance. may play important part in transmission in some interior and coastal villages closely surrounded by bush and in some bush plantations. (2015) restricted to Samoan Islands. (2020)
<i>Aedes aegypti</i>	of no importance in transmission (2126) no infection has ever been found in this mosquito. (2129)		drums. larvae present even in remote areas and even in clean water.		additional sources: 2033, 2086, 2101.
<i>Aedes nocturnus</i>					source: 2020.
<i>Aedes oceanicus</i>	no infection has ever been found in this mosquito. (2129)	verandah of school building, Samoan "fale," outside on grassy ground under a tree. 2128)	pandanus. (2126) pandanus trees, giant taro. (2128) pandanus, taro, giant taro, pineapple. larvae present in every village of Upolu in leaf axils of pandanus. (2129)	night biter. (2129)	wide ranging. (2015) additional sources: 2020, 2101.
			52		

Table 4 cont.

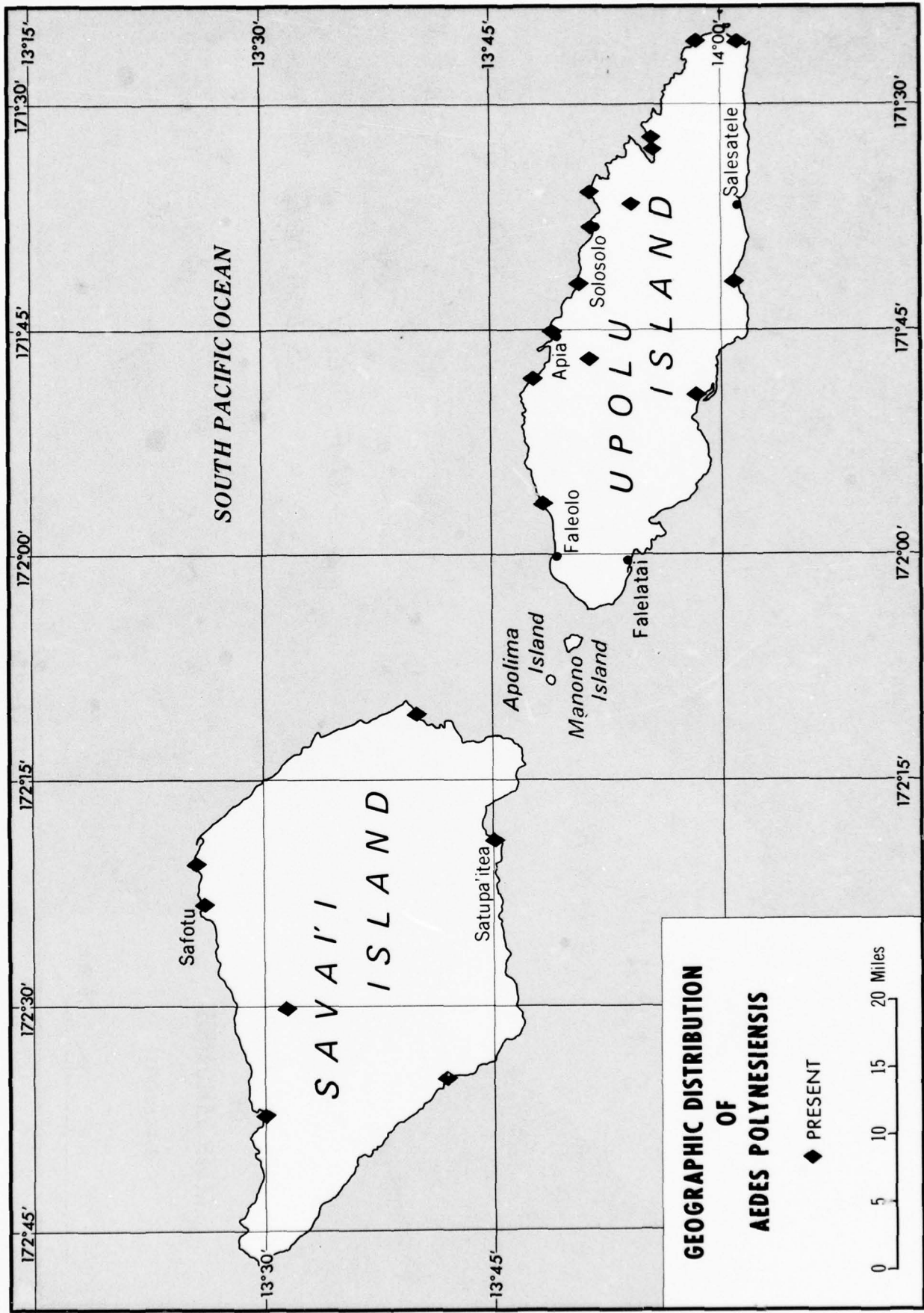
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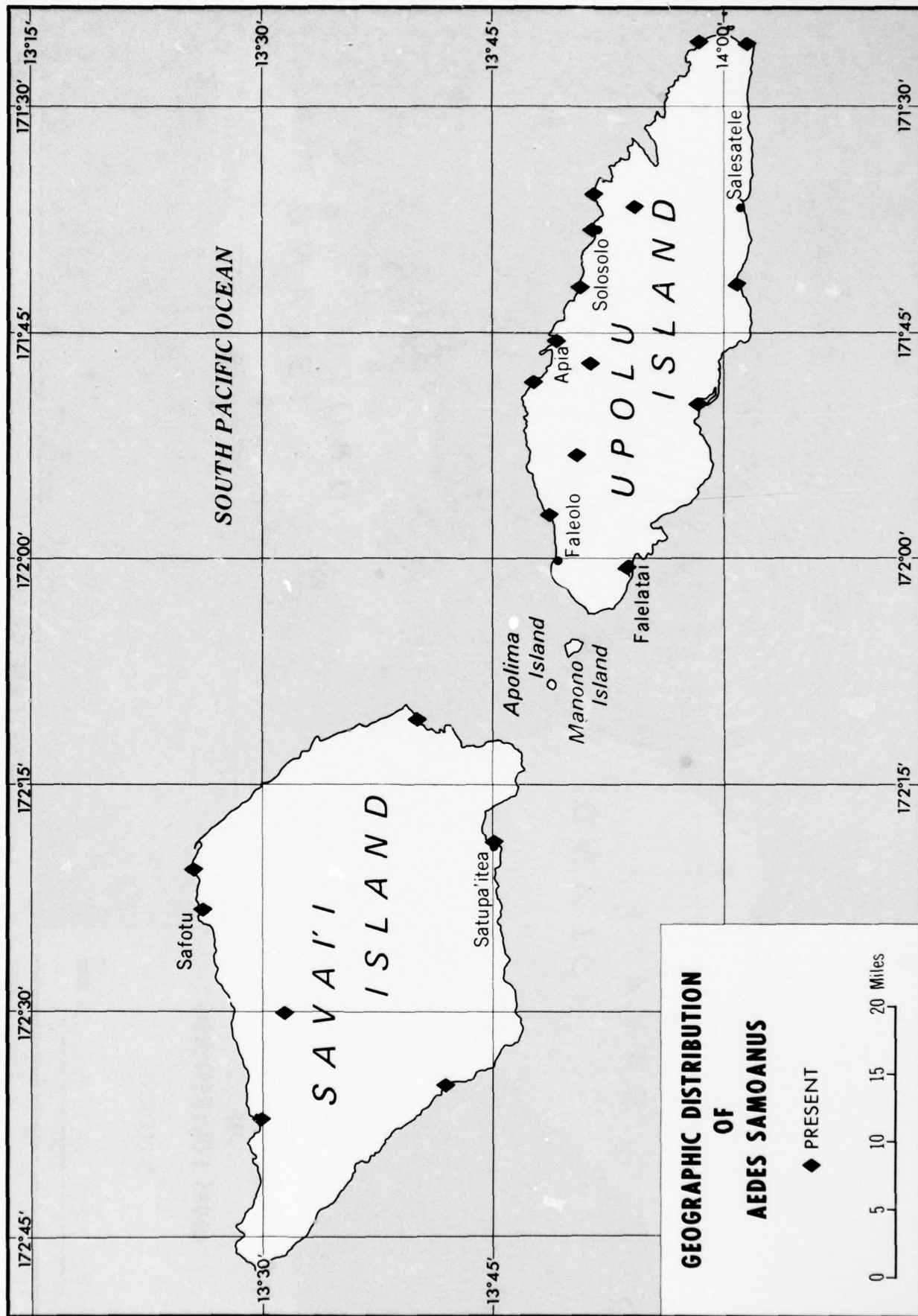
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes tutuila</i>	no infection has ever been found in this mosquito. (2129)	verandah of school building, Samoan "fale," grassy ground under a tree. (2128)	exclusively in pandanus leaf axils from sea level to 1500 feet. (2020) pandanus. (2127) pandanus trees. (2128) pandanus. larvae present in every village in Upolu in leaf axils of pandanus. breeds mainly in higher axils which are usually covered. usually more larvae present in young trees than in older ones. (2129)		only reported in the Samoas. (2020) density seems to be correlative to the amount of rainfall in a whole month period from 2 months before to 1 month before the survey. (2128)
<i>Aedes vexans</i>					source: 2086.
<i>Culex annulirostris</i>					sources: 2020, 2086.
<i>Culex fatigans</i>	of no importance in transmission. (2126)	verandah of school building, Samoan "fale," outside on the grassy ground under a tree. resting—present in shaded areas, absent in unshaded areas. (2128)	pit latrines. (2126) tree holes, drums, coconut shells, ditch, swamp. (2128) larvae present in coconut shells. seems to breed only when water in shells is dirty. breeding in canoes rather rare but where present is very high. (2129)	night feeder. (2100) night biter. (2126) night biter. (2129)	mainly present in urbanized areas. (2126) additional sources: 2020, 2101, 2086.

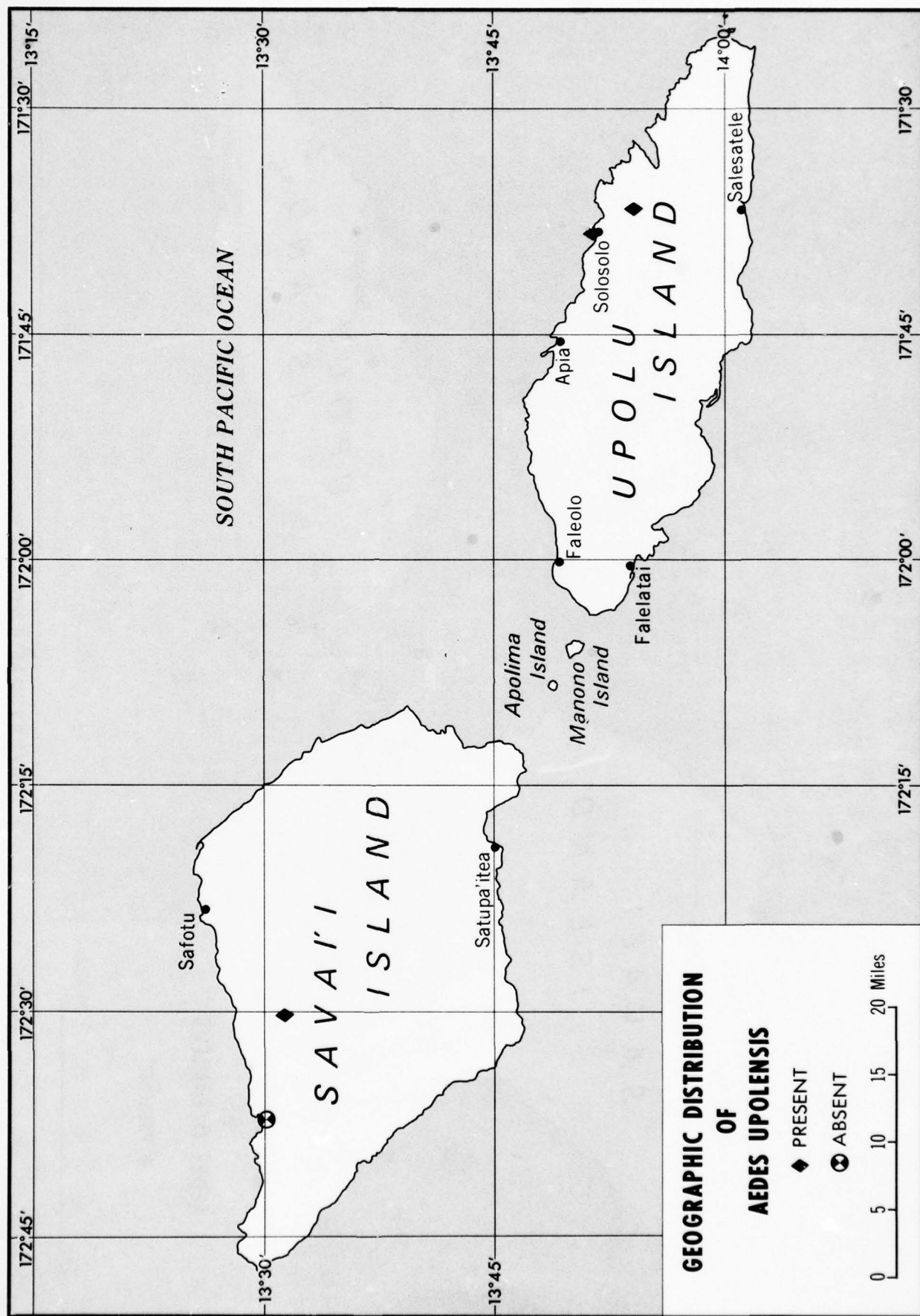
Table 4 cont.

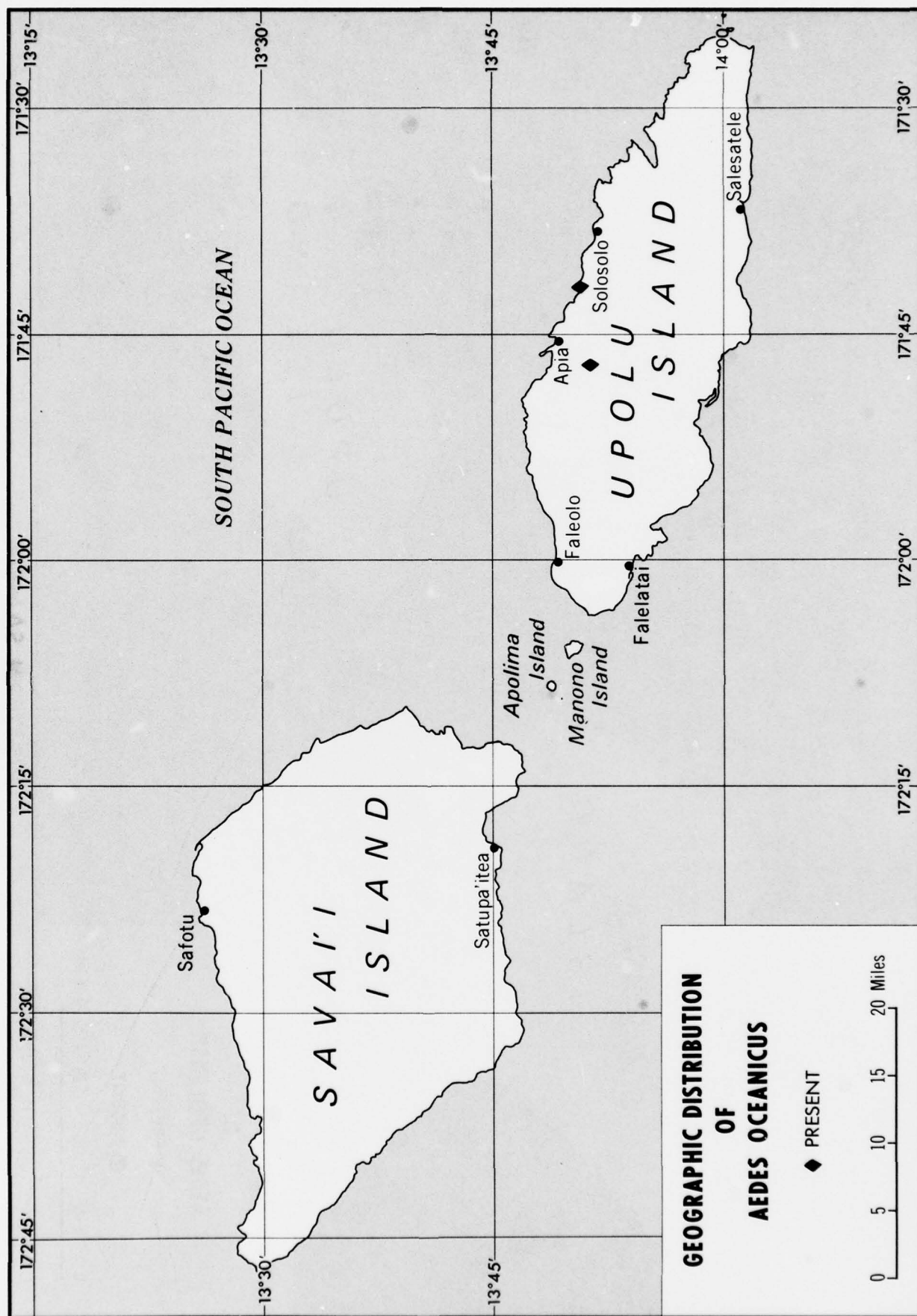
WESTERN SAMOA — MOSQUITO DATA

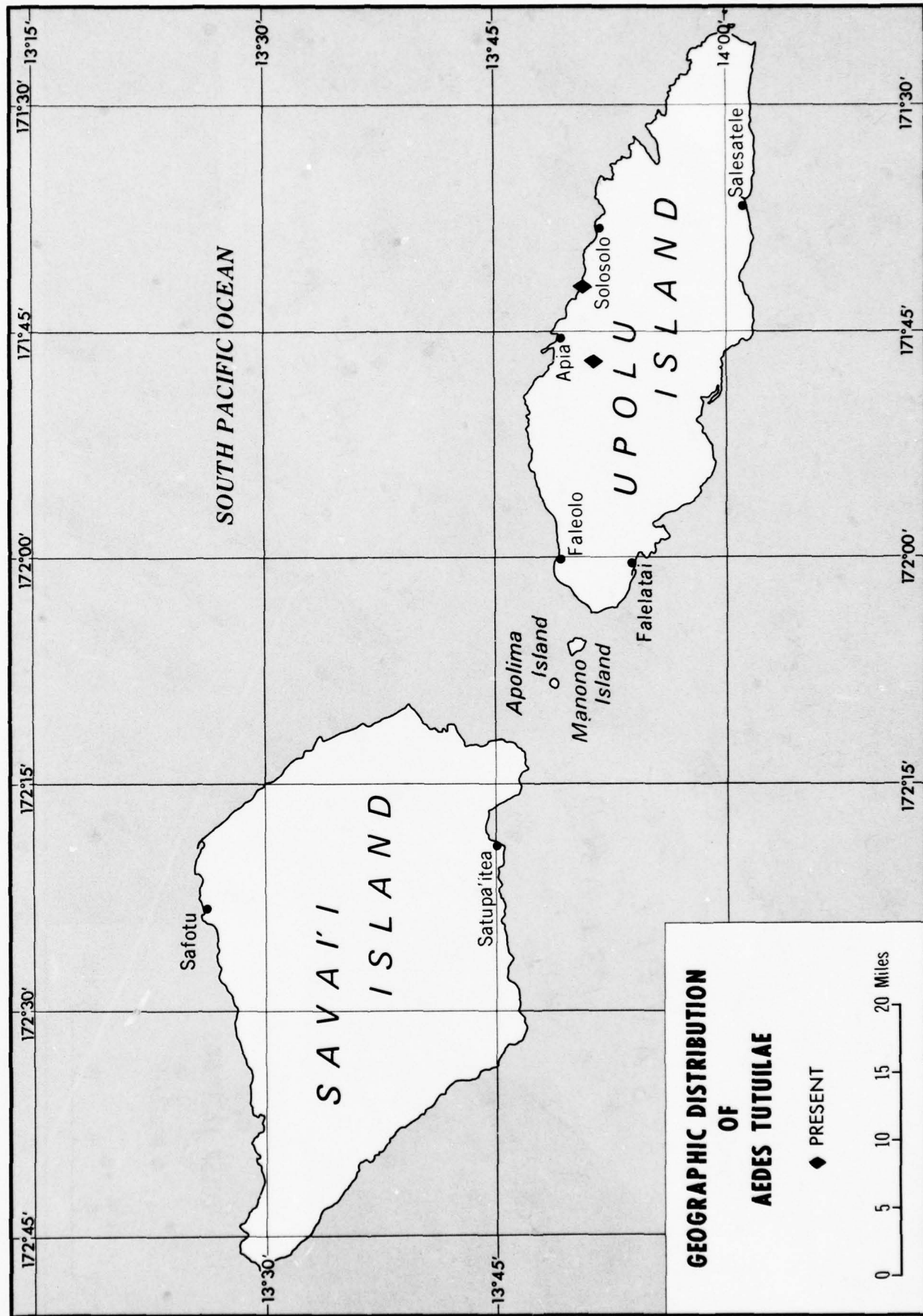
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex</i> <i>sitiens</i>			rock holes. (2127)		
<i>Toxorhynchites</i> <i>brevipalpis</i>			tree holes. (2127)		

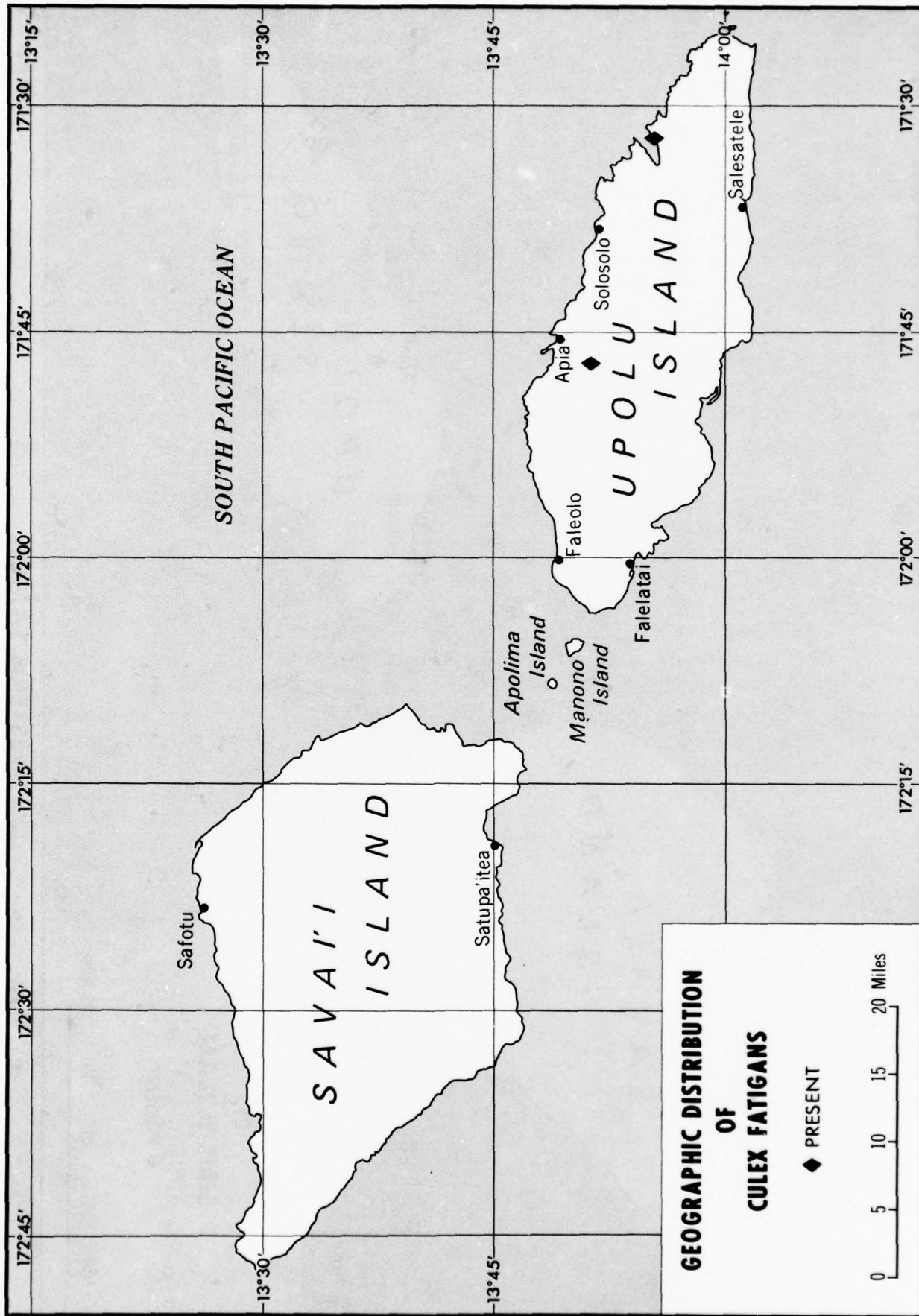












BIBLIOGRAPHY

WESTERN SAMOA AND HUMAN

<u>Document Number</u>	<u>Source</u>
2002	Desowitz, R. S. and B. A. Southgate. 1973. Studies on filariasis in the Pacific: 2. Persistence of microfilaraemia in diethylcarbamazine treated populations of Fiji and Western Samoa: Diagnostic application of the membrane filtration technique. S. E. Asian Jour. Trop. Med. Publ. Hlth. 4(2): 179-183.
2008	McCarthy, D. D. and N. Fitzgerald. 1956. I. Habit, habitat and hyperfilarisation in the epidemiology of filariasis in Western Samoa. Trans. Roy. Soc. Trop. Med. Hyg. 50 (1): 58-65.
2009	McCarthy, D. D. 1956. II. Pseudo Periodicity in the Pacific variety of <u>Wuchereria bancrofti</u> : a study of fluctuations in the density of microfilariae in the blood of Samoans. Trans. Roy. Soc. Trop. Med. Hyg. 50 (1): 66-71.
2010	McCarthy, D. D. and N. Fitzgerald. 1955. Researches in Western Samoa. III. Observations of filariasis. Trans. Roy. Soc. Trop. Med. Hyg. 49 (1): 82-89.
2020	Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323.
2024	Bryan, Joan H. and B. A. Southgate. 1973. Investigation of the transmission potential of ultra low level <u>Wuchereria bancrofti</u> microfilaria carriers after diethylcarbamazine treatment. Wld. Hlth. Org. Mongr. Ser. #WHO/FIL/73.116: 1-11.
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2042	World Health Organization Regional Office for the Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.

- 2087 Flynn, Philip D. 1944. Filariasis suspects. Review of cases. U.S. Naval Medical Bulletin. 42 (5): 1075-1079.
- 2095 O'Connor, Francis W. 1922. Some results of medical researches in the Western Pacific. Trans. Roy. Soc. Trop. Med. Hyg. 16 (1&2): 28-56.
- 2099 Webster, Earle H. 1946. Filariasis among white immigrants in Samoa. U.S. Naval Medical Bulletin. 46: 186-192.
- 2101 Suzuki, T. and F. Sone. 1973. Filarial infection in vector mosquitos after mass drug administration in Western Samoa. Wld. Hlth. Org. Mongr. Ser. #FIL/73.117 + VBC/73. 446: 1-13.
- 2125 Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.
- 2126 Thieme, J. C., I. Esera and Tin Maung Maung. 1968. Preliminary results of filariasis control project in Western Samoa. Unpublished. 1-64.
- 2130 Unknown. 1973. Raw Data. Western Samoa. Unpublished. 1-14.
- 2132 Maung, Tin Maung. 1966. Filariasis control project, Western Samoa. Report for period after arrival at duty station to end of 1966 (from 7 December 1966 to 31 December 1966). Unpublished. 1-8.

BIBLIOGRAPHY

WESTERN SAMOA AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2010	McCarthy, D. D. and N. Fitzgerald. 1955. Researches in Western Samoa. III. Observations of filariasis. Trans. Roy. Soc. Trop. Hyg. 49 (1): 82-89.
2015	Ramalingam, Shivaji and John N. Belkin. 1964. Vectors of sub-periodic bancroftian filariasis in the Samoa Tonga area. Nature. London. 201: 105-106.
2020	Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323.
2024	Bryan, Joan H. and B. A. Southgate. 1973. Investigation of the transmission potential of ultra low level <u>Wuchereria bancrofti</u> microfilaria carriers after diethylcarbamazine treatment. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/73.116: 1-11.
2033	Rosen, Leon. 1955. Observations on the epidemiology of human filariasis in French Oceania. American Journal of Hygiene. 61 (2): 219-248.
2036	Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2086	Byrd, Elon E., Lyle S. St. Amant and Leon Bromberg. 1945. Studies on Filariasis in the Samoan area. U.S. Naval Medical Bulletin. 44 (1): 1-19.
2100	Suzuki, T. and F. Sone. 1973. Bionomics of filariasis vectors in Western Samoa. Wld. Hlth. Org. Mongr. Ser. #FIL/73.115 + VBC/73.443: 1-15.

- 2101 Suzuki, T. and F. Sone. 1973. Filarial infection in vector mosquitos after mass drug administration in Western Samoa. Wld. Hlth. Org. Monogr. Ser. #FIL/73. 117 + VBC/73.446: 1-13.
- 2125 Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.
- 2126 Thieme, J. C., I. Esera and Tin Maung Maung. 1968. Preliminary results of filariasis control project in Western Samoa. Unpublished. 1-64.
- 2127 Maung, Tin Maung and Lanu Penaia. 1971. Filariasis control project. Unpublished. 1-19.
- 2128 Maung, Tin Maung and Lanu Penaia. 1971. Filariasis control project. Western Samoa. First quarterly report 1971. Unpublished. 1-18.
- 2129 Esera, I. and Tin Maung Maung. 1970. Filariasis control project. Western Samoa. Annual report 1970. Unpublished. 1-28.
- Maung, Tin Maung. 1966. Filariasis control project, Western Samoa. Report for period after arrival at duty station to end of 1966. (From 7 December 1966 to 31 December 1966.) Unpublished. 1-8.

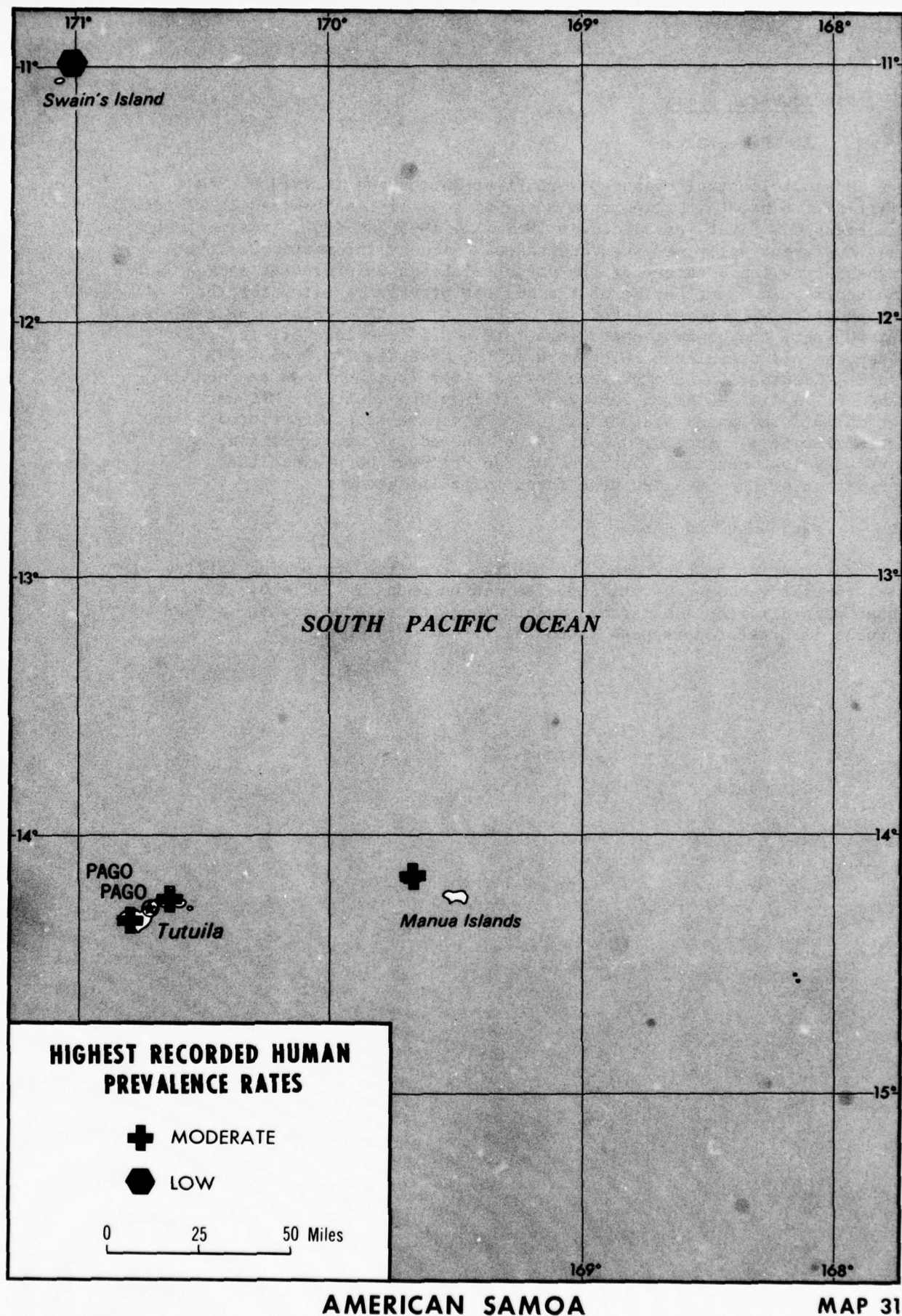
D. American Samoa

1. Human Data

Mosquito control measures were first introduced in 1943 by the military. Since that time, some means of control has remained in effect. Treatment was first introduced in 1963. In 1965 and 1967, treatment of the persistent positives was undertaken. Summary information of the highest prevalence rates for the various islands is presented in Map 31. The geographic distribution of the highest prevalence rates for the island of Tutuila is presented in Map 32. With the exception of Swain's Island where the highest prevalence rate was in the low (0.1 to 9.9%) category, all prevalence rates were in the moderate (10.0 to 49.9%) range. Information on prevalence rates after treatment can be found in Table 5. A limited blood survey of children and adults by MFC carried out in 1973 indicated that transmission may have been interrupted by the anti-filariasis campaign. About 10% of the adults were positive, most with very low densities, but none of the children born since the initiation of the campaign were found to be infected.

2. Mosquito Data

Information on the role, the habitat, breeding and biting habits, etc. for the various mosquito species can be found in Table 6. The geographic distribution of the various mosquito species for the island of Tutuila is presented in Maps 33 to 35.



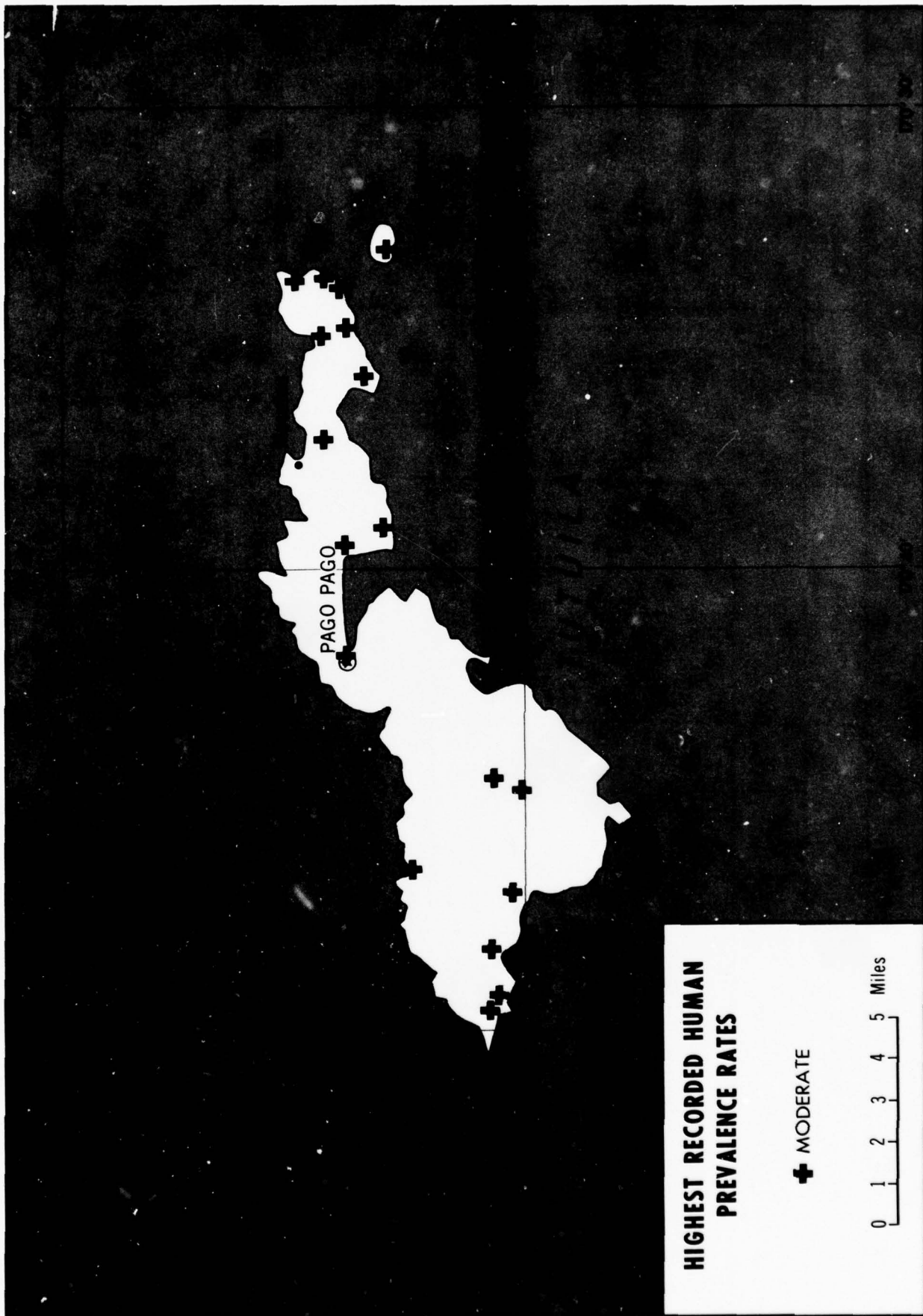


Table 5

AMERICAN SAMOA — MOST RECENT PREVALENCE RATES

LOCATION	DATE	MATERIAL	METHODS	PREVALENCE	TREATMENT INFORMATION
AMERICAN SAMOA (2042)	1965 to 1966	capillary blood	20 cmm smear	7.4%	post control
TUTUILA (2018)	1967	capillary blood	20 cmm smear	0.4%	2 years after second mass treatment
Aloa (2018)	1965	capillary blood	20 cmm smear	0.0%	2 years after second mass treatment
Alofau (2018)	1967	capillary blood	20 cmm smear	0.7%	2 years after second mass treatment
Amanave (2018)	1967 to 1968	capillary blood	40 cmm (2x20) smear	0.8%	after second mass treatment
Anouli (2018)	1967 to 1968	capillary blood	40 cmm (2x20) smear	0.0%	after second mass treatment
Malaeloa (2018)	1967 to 1968	capillary blood	40 cmm (2x20) smear	9.2%	did not receive second mass treatment
Onenoo (2018)	1965	capillary blood	20 cmm smear	0.0%	2 years after second mass treatment
Tula (2018)	1967	capillary blood	20 cmm smear	0.4%	2 years after second mass treatment
Utumea (2018)	1967	capillary blood	20 cmm smear	1.0%	2 years after second mass treatment

Table 6

AMERICAN SAMOA A — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	important vector. (2012) non-periodic vector. (2036)	density consistently and significantly greater in undergrowth than in villages. rest on leaf underside near breeding containers and in rock wall cracks. not found resting inside houses. (2013) coconut and banana groves. scarce in villages. (2041) rest in dry tree holes, partially detached bark, underside of leaves and dry coconut husks. places sheltered from the wind but not inside houses. (2020)	broken crockery bottles, tree holes, coconut shells. (2041) containers just above the water line in well shaded areas. coconut shells most frequent. (2013) tree holes, rock holes, crab holes, coconut shells, large and small artificial containers, pandanus leaf axils, banana leaves, banana stumps, ground pools, cacao pods. (2020)	lesser biting peak in morning. greater biting peak in afternoon some night biting indoors and out. mainly man but also pigs, horses, dogs and probably birds. (2020) man seems to be preferred host. (2013)	no seasonal variation in density. flight range = less than 100 yards. mean survival = 21.2 days. apparently requires blood meal for oviposition. (2013) dispersal less than 100 yards. (2020) additional source: 2032.
* <i>Aedes pseudoscutellaris</i>	major vector. (2086) important vector. (2011)	associated more with wild or natural cover than with artificial or domestic cover. (2011) rests in grass vines beneath houses near breeding place. (2086)	tin cans, coconut shells, tree rot holes, rain water barrels, troughs and cisterns, all shaded. rarely breeds in direct sunlight. eggs laid on moist area just above water level. (2030) any small water collection except ground puddles. (2086)	does not enter center village green to bite. (2030) throughout the day in any area with peak in the shade and at dawn and dusk. night biter. (2086) feeds by preference during cooler hours after daybreak and before sunset rather than in midday heat. (2011)	wind shifted the distribution of the infected mosquitoes to the leeward side of each village. (2086) widely distributed with diurnal habits. (2011)

Table 6 cont.

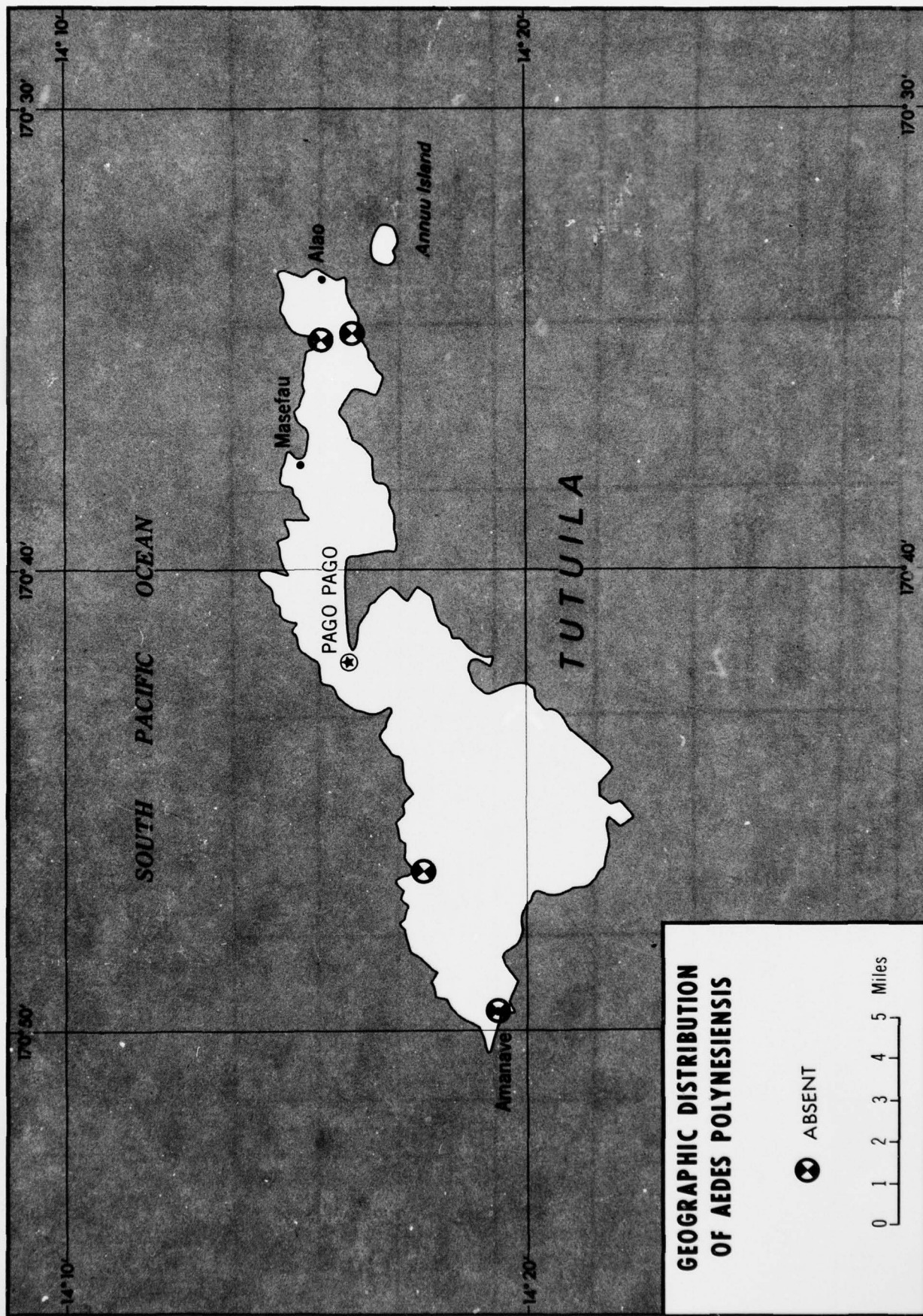
AMERICAN SAMOA — MOSQUITO DATA

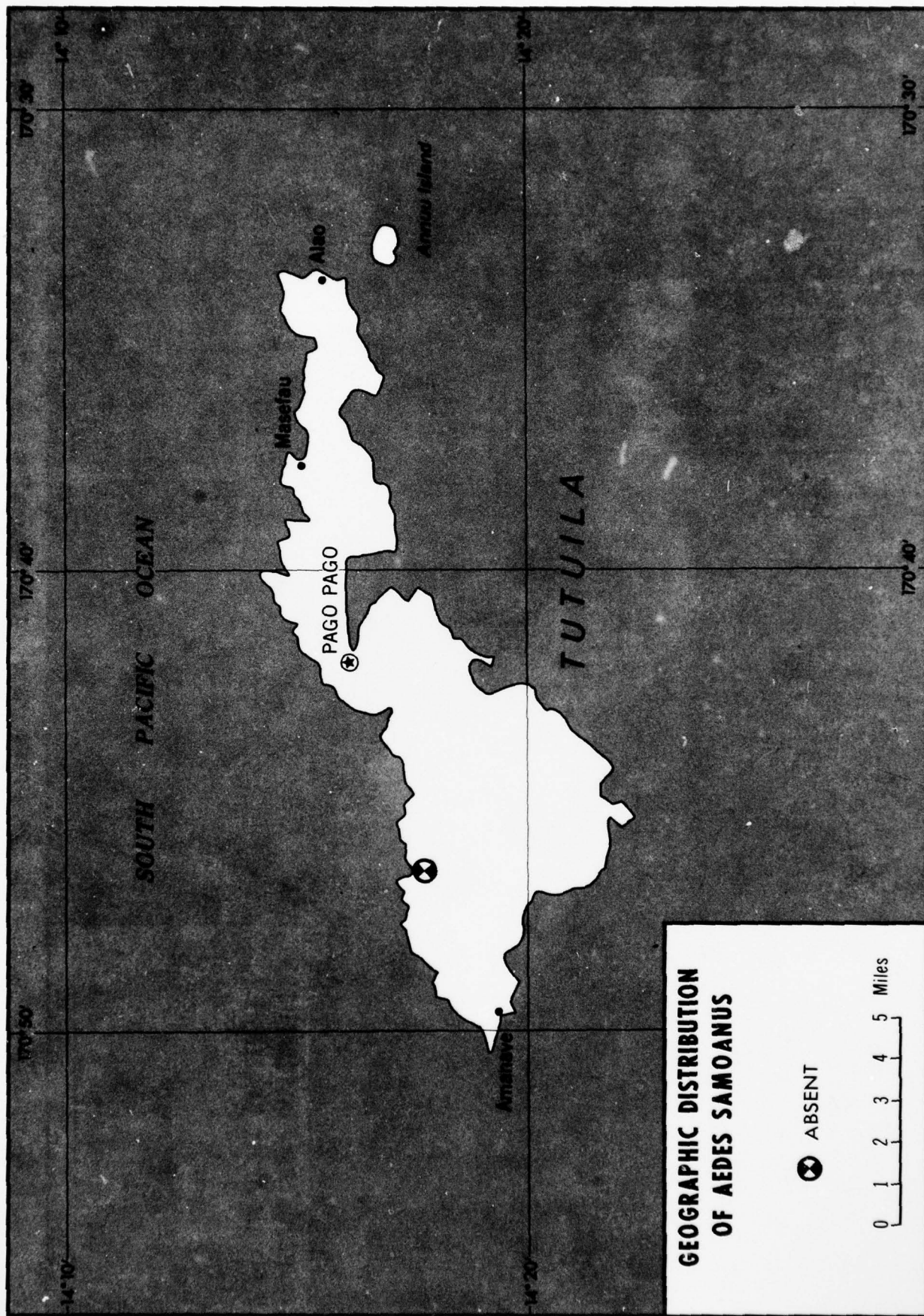
	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes pseudoscutellaris</i> (cont.)				feeder at twilight and dusk or any hour in shade or under clouds. noiseless flight immediate feeding upon alighting. almost painless bite. (2030)	
* <i>Aedes samoanus</i>	major vector. (2042) very important vector. (2015)	truly forest or bush mosquito. occurs in some villages where the virgin forest borders the village. (2020) found resting in houses at night and in the early morning. (2042)	leaf axils of forest creeper, <i>freycinetia</i> sp., which occurs only in native jungle and bush. does not breed in pandanus in Tutuila. (2020) leaf axils of <i>freycinetia</i> and common pandanus. (2042)	feeds readily on man. bites by day. (2020) night biter with peak at 2300. (2042) night biter. (2086)	exceedingly abundant nocturnal species in interior villages and in some coastal villages closely surrounded by bush. (2015) interior villages and coastal villages near bush due to, primarily, breeding requirements of forest creeper. (2020) not involved in open village transmission. (2042)
<i>Aedes variegatus</i>	vector. (2085)		natural and artificial containers. (2085)	dim light biter. (2085)	
<i>Aedes upolensis</i>	minor vector. (2042)	bush. (2015) truly forest or bush mosquito. occurs in some villages where the virgin forest borders in villages. (2020)	fallen tree stumps, fern tree stumps in deep forest. (2042)	feeds readily on man. bites by day. (2020)	restricted in distribution and abundance. may play important part in transmission in some interior and coastal villages closely surrounded by bush and in some bush plantations. (2015) restricted to the Samoan Islands. (2020)
* Major Vector			70		

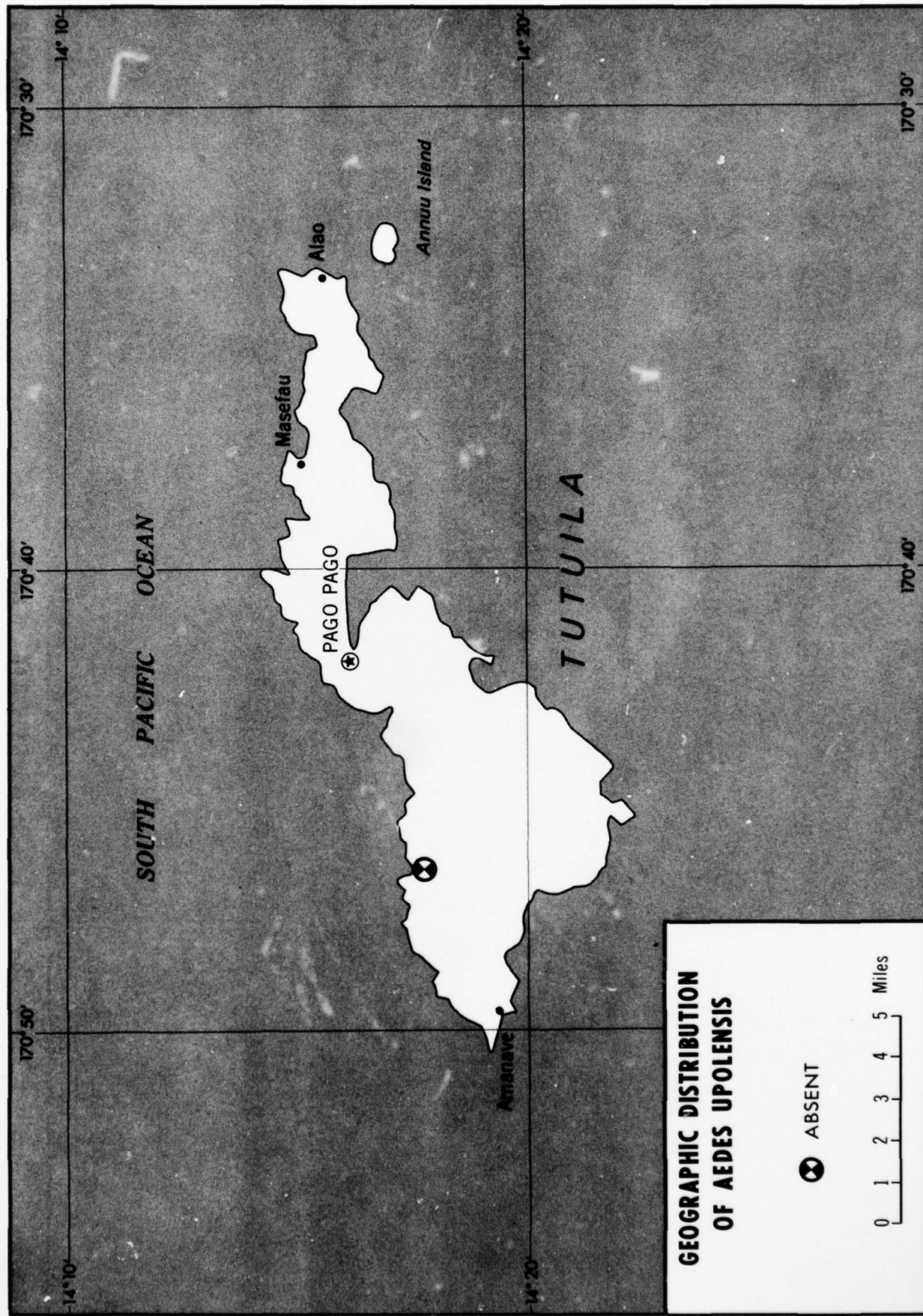
Table 6 cont.

AMERICAN SAMOA - MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes tutuilae</i>	suspected vector. (2042)		common pandanus. (2042) exclusively in pandanus leaf axils from sea level to 1500 feet. (2020)		only reported in Samoa. (2020)
<i>Aedes aegypti</i>					sources: 2030, 2033, 2086.
<i>Aedes oceanicus</i>					wide ranging. (2015) additional source: 2020.
<i>Aedes vexans</i>					sources: 2030, 2086.
<i>Culex annulirostris</i>					sources: 2020, 2086
<i>Culex fatigans</i>					sources: 2020, 2030, 2086.







BIBLIOGRAPHY

AMERICAN SAMOA AND HUMAN

<u>Document Number</u>	<u>Source</u>
2011	Jachowski, Leo A. Jr. and Gilbert F. Otto. 1952. Filariasis in American Samoa. II. Evidence of transmission outside of villages. Amer. Jour. Trop. Med. Hyg. 1 (4) 662-670.
2012	Jachowski, Leo A. Jr. and Gilbert F. Otto. 1955. Filariasis in American Samoa. IV. Prevalence of microfilaremia in the human population. American Journal of Hygiene. 61: 334-348.
2016	Mahoney, Louis E. and John F. Kessel. 1971. Treatment failure in filariasis mass treatment programmes. Bull. Wld. Hlth. Org. 45: 35-42.
2018	Kessel, John F., Nofo Siliga, Harry Tompkins Jr. and Kenneth Jones. 1969. Periodic mass treatment with diethylcarbamazine for control of filariasis in American Samoa. Unpublished. 1-26.
2020	Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323.
2021	Ciferri, Flavio, Nofo Siliga, Garv Long and John F. Kessel. 1966. Filariasis control programme in American Samoa. Wld. Hlth Org. Monogr. Ser. #S FIL/66.62: 1-26.
2026	Kessel, John F. 1971. Review of the filariasis control programme in Tahiti from November 1967 to January 1968. Bull. Wld. Hlth. Org. 44: 783-794.
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on central and South Pacific Islands. South Pacific Commission Technical Paper. #125: 1-96.

- 2032 Otto, Gilbert F. and Leo A. Jachowski Jr. 1955. Problems in the epidemiology and control of filariasis. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/9: 1-55.
- 2040 Jachowski, Leo A. Jr., Gilbert F. Otto and James D. Wharton. 1951. Filariasis in American Samoa. I. Loss of microfilaria in the absence of continued reinfection. Proc. Helminth. Soc. Wash. 18 (1) 25-28
- 2041 Jachowski, Leo A. Jr. 1957. Filariasis in American Samoa. VI. Survey of Swain's Island. Proc. Helminth. Soc. Wash. 24 (1) 26-29.
- 2042 World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final Report. Wld. Hlth Org. Monogr. Ser. #WPR/350/68: 1-44.
- 2051 Self, L.S., M. H. M. Abdulcader and M. M. Tun. 1969. Preferred biting sites of Culex pipiens fatigans on adult Burmese males. Bull. Wld. Hlth. Org. 40 (2): 324-327.
- 2085 Dickson, James G., Robert W. Huntington Jr. and Samuel Eichold. 1943. Filariasis in defense force, Samoan group. U.S. Naval Medical Bulletin. 41 (5) 1240-1251.
- 2087 Flynn, Philip D. 1944. Filariasis suspects. Review of cases. U.S. Naval Medical Bulletin. 42 (5): 1075-1079.
- 2088 Desowitz, Robert S. and Steven J. Berman. 1973. Epidemiological investigations on filariasis in the South Pacific and Indonesia. Report on visits made from 18 July to 9 September 1973. Unpublished. WHO consultants. 1-48.
- 2095 O'Connor, Francis W. 1922. Some results of medical researches in the Western Pacific. Trans. Roy. Soc. Trop. Med. Hyg. 16 (1&2): 28-56.
- 2099 Webster, Earle H. 1946. Filariasis among white immigrants in Samoa. U.S. Naval Medical Bulletin. 46: 186-192.

BIBLIOGRAPHY
AMERICAN SAMOA AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2011	Jachowski, Leo A. Jr. and Gilbert F. Otto. 1952. Filariasis in American Samoa. II. Evidence of transmission outside of villages. Amer. Jour. Trop. Med. Hyg. 1 (4): 662-670.
2012	Jachowski, Leo A. Jr. and Gilbert F. Otto. 1955. Filariasis in American Samoa. IV. Prevalence of microfilaremia in the human population. American Journal of Hygiene. 61: 334-348.
2013	Jachowski, Leo A. Jr. 1954. Filariasis in American Samoa. V. Bionomics of the principal vector, <u>Aedes polynesiensis</u> Marks. American Journal of Hygiene. 60: 186-203.
2015	Ramalingam, Shivaji and John N. Belkin. 1964. Vectors of sub-periodic bancroftian filariasis in the Samoa Tonga area. Nature. London. 105-106.
2018	Kessel, John F., Nofo Siliga, Harry Tompkins Jr. and Kenneth Jones. 1969. Periodic mass treatment with diethylcarbamazine for control of filariasis in American Samoa. Unpublished. 1-26.
2020	Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323.
2021	Ciferri, Flavio, Nofo Siliga, Gary Long and John F. Kessel. 1966. Filariasis control programme in American Samoa. Wld. Hlth. Org. Monogr. Ser. #S FIL/66.62: 1-26.
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2032	Otto, Gilbert F. and Leo A. Jachowski, Jr. 1955. Problems in the epidemiology and control of filariasis. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/9: 1-55.

- 2033 Rosen, Leon. 1955. Observations on the epidemiology of human filariasis in French Oceania. American Journal of Hygiene. 61 (2) 219-248.
- 2038 Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
- 2041 Jachowski, Leo A. Jr. 1957. Filariasis in American Samoa. VI. Survey of Swain's Island. Proc Helminth. Soc. Wash. 24 (1): 26-29.
- 2042 World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
- 2085 Dickson, James G., Robert W. Huntington Jr. and Samuel Eichold. 1943. Filariasis in defense force, Samoan group. U.S. Naval Medical Bulletin. 41 (5): 1240-1251.
- 2086 Byrd, Elon E., Lyle S. St. Amant and Leon Bromberg. 1945. Studies on filariasis in the Samoan area. U.S. Naval Medical Bulletin. 44 (1): 1-19.

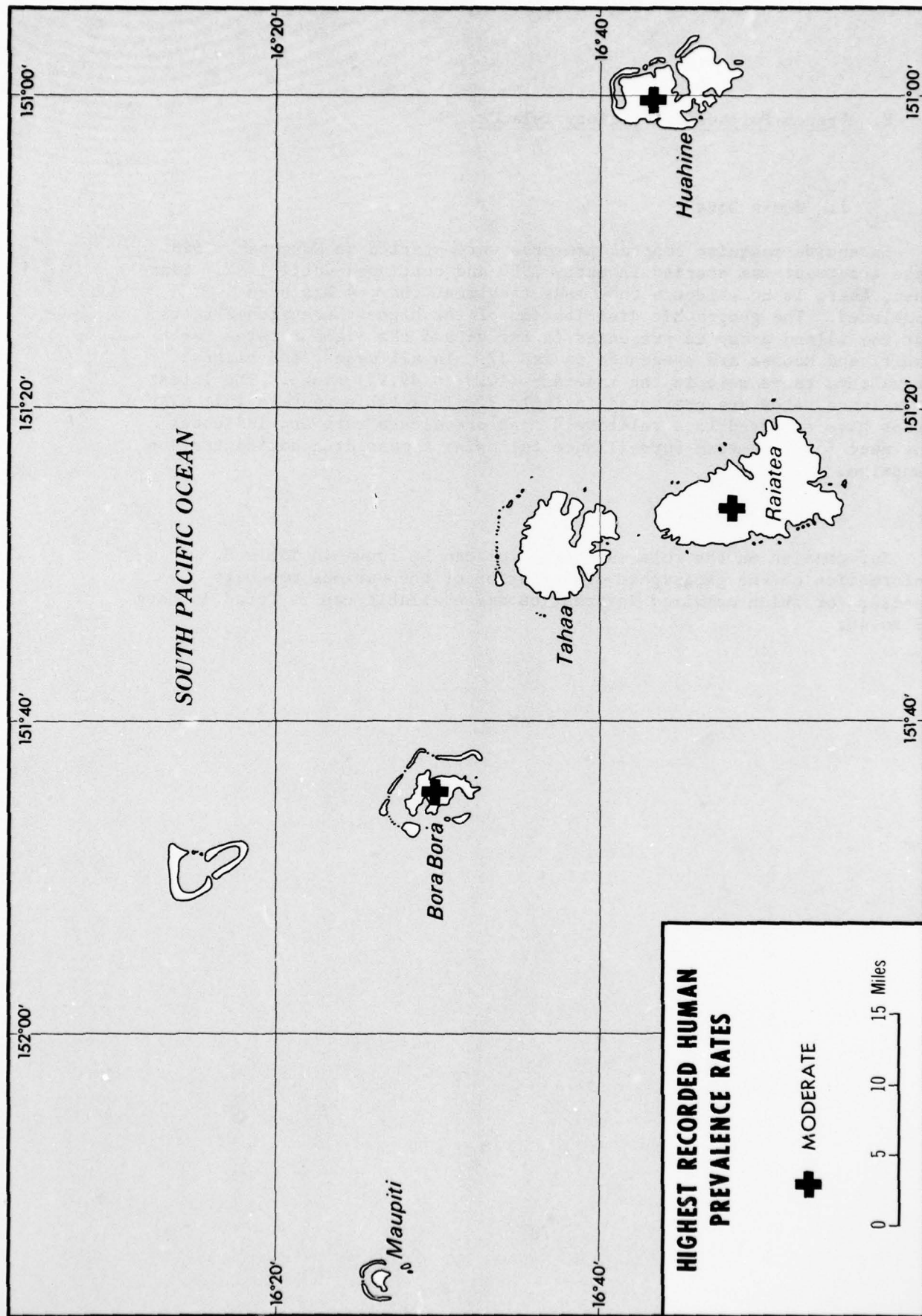
E. French Polynesia: Society Islands

1. Human Data

Extensive mosquito control measures were started in November, 1948. Mass treatment was started in early 1950 and continued until 1954. Since then, there is no evidence that mass treatment therapy has been continued. The geographic distribution of the highest prevalence rates for the island group is presented in Map 36 and the highest rates for Tahiti and Moorea are presented in Map 37. In all cases, the highest prevalence rates were in the moderate (10.0 to 49.9%) range. The latest prevalence rates are presented in Table 7. This table reveals that many areas have reverted to a relatively high prevalence rate and indicates the need for long-term surveillance following a mass drug administration campaign.

2. Mosquito Data

Information on the role and bionomics can be found in Table 8. Information on the geographic distribution of the various mosquito species for which detailed information was available can be found in Maps 38 to 40.



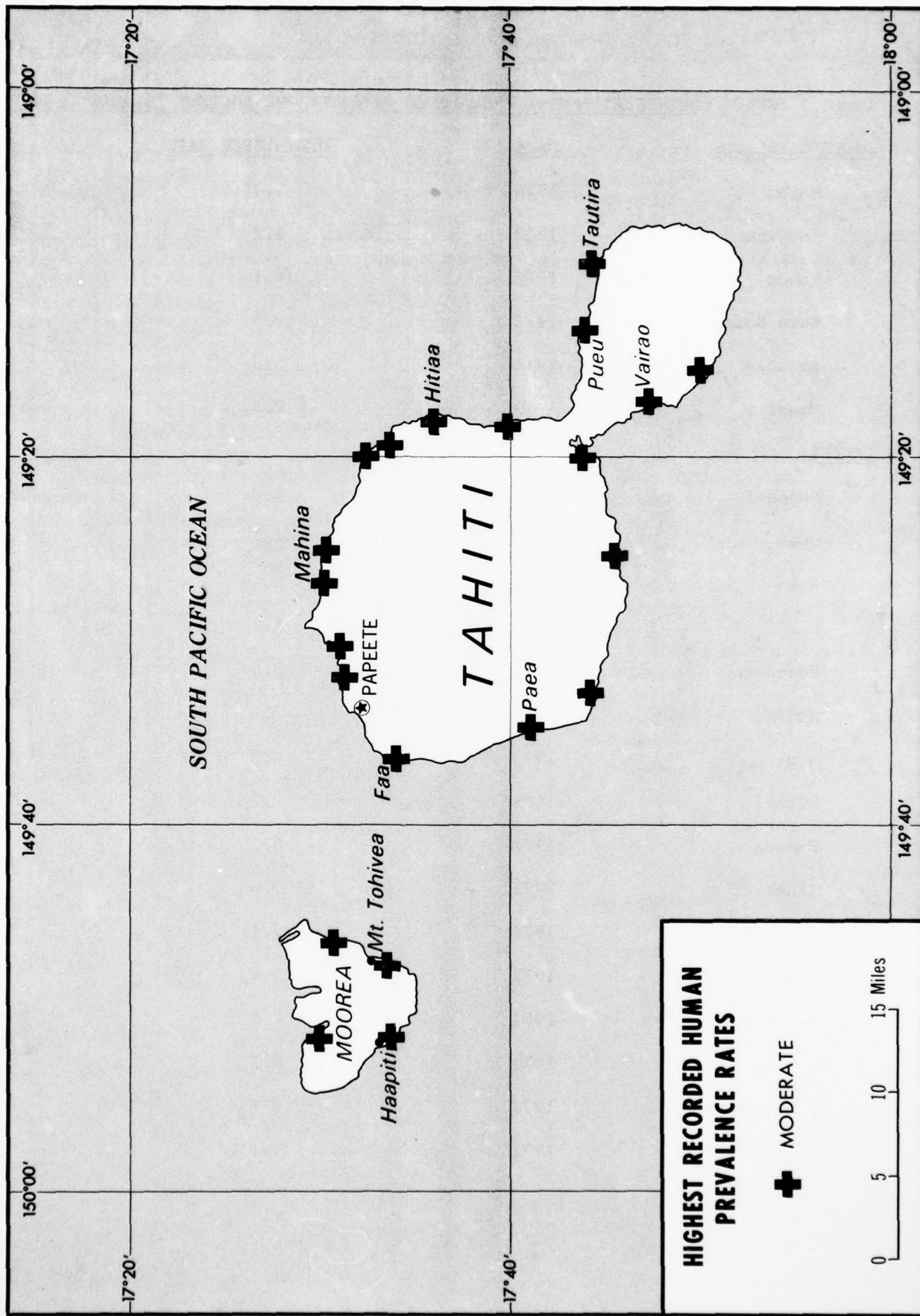


Table 7 FRENCH POLYNESIA: RECENT PREVALENCE RATES IN THE SOCIETY ISLANDS (2139)

<u>SOCIETY ISLANDS</u>	<u>DATE</u>	<u>PREVALENCE RATE</u>
Maiao	1974	6.7%
Huahine	1972	6.2
Tahaa	1972	14.1
Bora Bora	1972	3.4
Raiatea	1971	5.0
Maupiti	1969	0.8
<u>TAHITI</u>		
Papeari	1974	5.8
Pueu	1974	4.7
Paea	1974	5.1
Faa	1973	5.2
Punaavia	1973	3.5
Mahina	1973	3.1
Arue	1973	4.2
Pirae	1973	2.2
Papara	1972	6.2
Afaahiti	1972	3.4
Tohautu	1972	7.1
Faaone	1972	5.4
Maraiea	1971	4.5
Vairo	1971	6.3
Teahupoo	1971	2.8
Tautira	1971	1.8

Table 7 Con't

Hitiaa	1971	2.9
Mahaena	1971	3.1
Tiarei	1971	2.1
MOOREA		
Paopao	1974	1.5%
Haapiti	1974	1.8
Papetoai	1973	0.3
Teavaro	1973	2.6
Afareaitu	1973	1.1

Table 8

FRENCH POLYNESIA: SOCIETY ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>		forest dwelling, does not rest inside houses. (2057)	tree holes, coconuts, rock holes, crab holes, pirogues, metal drums, barrels. (2057) numerous in larva rock from upper wet regions to drier coastal regions. coconut, breadfruit and banana leaves especially in uncleared overgrown areas. rat-eaten coconuts, tree holes, cut bamboo stumps, crab holes, cisterns, rain barrels, tubs, drums, bottles, tin cans, auto tires, machinery, stored junk, canoes, animal waterers and ant guards. (2049)	only occasionally enters houses to bite, bites man, pigs, dogs, rats, and birds. (2057) daytime very aggressive reluctant to stop short of repletion on humans. (2033)	eggs resist drying. (2057) short flight range. (2049) eggs are resistant to drying, present in dry canoes. dilute sea water beneficial to egg laying and development. eggs may remain in many dry locations for some time developing in subsequent rains. (2049) additional source: 2026.
* <i>Aedes pseudoscutellaris</i>					sources: 2035, 2064.
<i>Aedes aegypti</i>				day or night. (2033) primarily man. (2057)	abundant in urban areas, rare in rural areas. (2057)
* Major Vector					

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HAWAII UNIV HONOLULU DEPT OF TROPICAL MEDICINE AND M--ETC F/G 6/5
A BIOMETRIC STUDY OF FILARIASIS 'WUCHERERIA BANCROFTI' IN THE S--ETC(U)
JUN 76 R S DESOWITZ DADA17-74-C-4042

UNCLASSIFIED

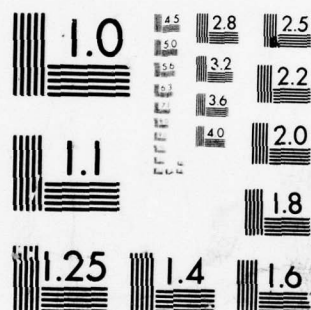
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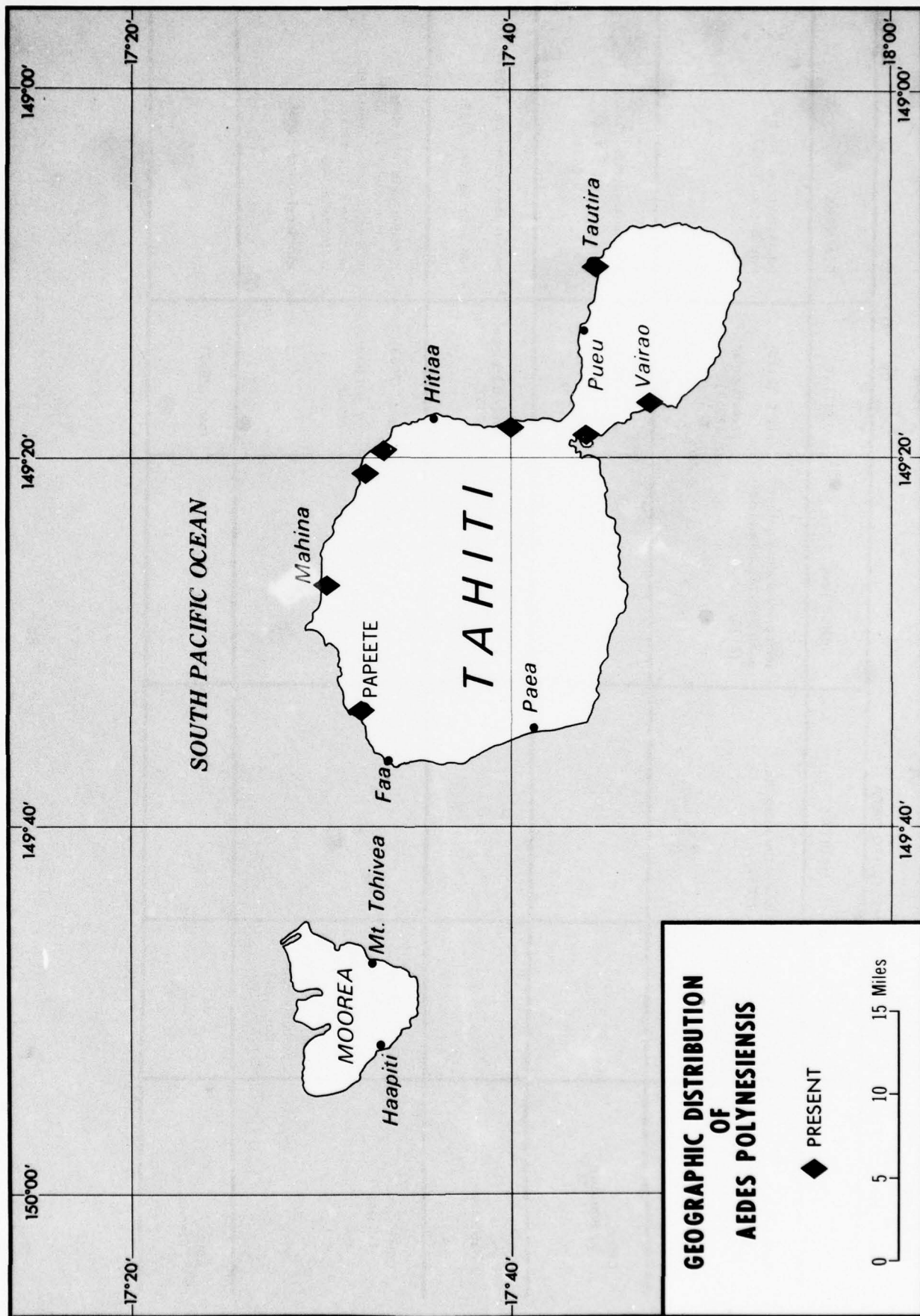


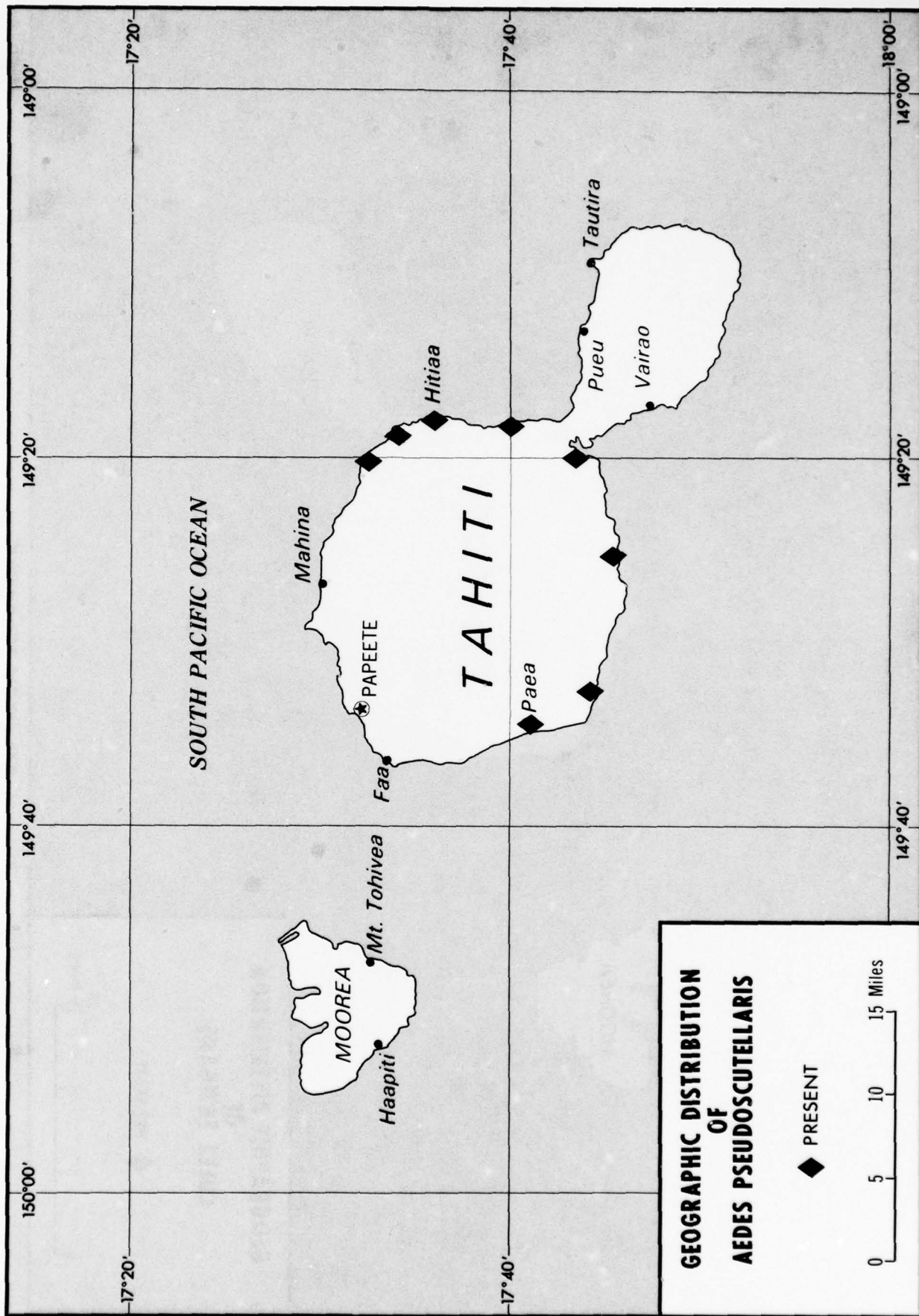
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

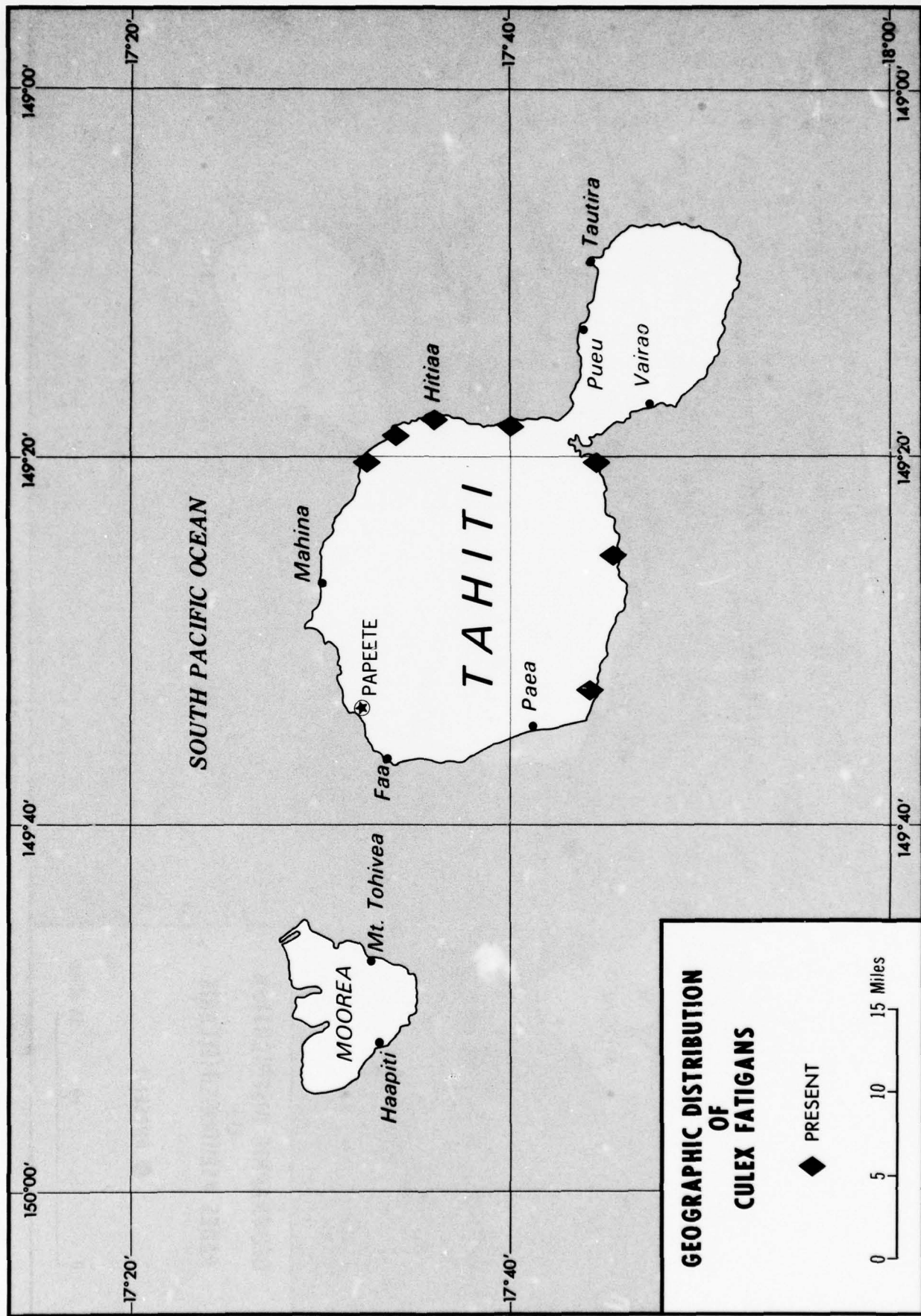
Table 8 cont.

FRENCH POLYNESIA: SOCIETY ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes edgari</i>	efficient host of non-periodic filaria. vector importance unknown. (2118)	flood water mosquito. (2057)	temporary shallow ground pools both shaded and open. (2118)	night. (2118) probably man. (2057)	population rare. spotty distribution. (2057)
<i>Culex annulirostris</i>				night. (2033) birds, dogs, man. (2057)	additional source: 2035.
<i>Culex atriceps</i>				rarely bites man. (2057)	population uncommon. (2057) additional source: 2033.
<i>Culex fatigans</i>	poor host for non-periodic strains based on percentage infective and third stage density. probably non-vector. (2033)			night. (2033) man and birds. (2057)	infectivity and third stage density not related to donor mosquito, indicating individual vector suitability. (2033) additional source: 2035.
<i>Culex littoralis</i>				man. (2057)	







BIBLIOGRAPHY

FRENCH POLYNESIA: SOCIETY ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2021	Ciferri, Flavio, Nofo Siliga, Gary Long and John F. Kessel. 1966. Filariasis control programme in American Samoa. Wld. Hlth. Org. Monogr. Ser. #S FIL/66.62: 1-26.
2026	Kessel, John F. 1971. Review of the filariasis control programme in Tahiti from November 1967 to January 1968. Bull. Wld. Hlth. Org. 44: 783-794.
2033	Rosen, Leon. 1955. Observations on the epidemiology of human filariasis in French Oceania. American Journal of Hygiene. 61 (2): 219-248.
2035	Beye, H. K., S. A. Edgar, R. Mille, J. F. Kessel and Ben Bambridge. 1952. Preliminary observations on the prevalence, clinical manifestations and control of filariasis in the Society Islands. Amer. Jour. Trop. Med. Hyg. 1 (4): 637-661.
2037	March, H. N., Jacques Laigret, John F. Kessel and Ben Bambridge. 1960. Reduction in the prevalence of clinical filariasis in Tahiti following adoption of a control program. American Journal of Tropical Medicine. 9: 180-184.
2038	Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2057	Kessel, John F. 1957. Effective programme for the control of filariasis in Tahiti. Bull. Wld. Hlth. Org. 16: 633-664.

- 2060 Bonnet, David D., John F. Kessel, Jacques Kerrest and Herald Chapman. 1956. Mosquito collections and dissections for evaluating transmission of filariasis in Polynesia (Tahiti). Amer. Jour. Trop. Med. Hyg. 5: 1093-1102.
- 2064 Beye, H. K., J. F. Kessel, J. Heuls, G. Thooris and Ben Bambridge. 1963. Nouvelles recherches sur l'importance, les manifestations cliniques, et la lutte contre la filariose a Tahiti, Oceanie Francaise. Bull. Soc. Path. Exot. 46 (1): 144-163.
- 2071 Galliard, H., R. Mille and W. A. Robinson. 1949. Recherches sur la filariose a Tahiti. Bull. Soc. Path. Exot. 42: 174-178.
- 2137 I. R. M. L. M. 1973. Controle des porteurs de microfilaires avant recuz un traitement de notezine. Raw data. Unpublished. 1-23.
- 2138 Unknown. 1969. Raw data - Tahiti and Tubuai Islands - filariasis. Unpublished. 1-24.
- 2139 Unknown. 1974. Resultat hematologique des communes de Tahiti et Moorea Maiao. Raw data. Unpublished. 1-30.
- 2140 Institut de Recherches Medicales de la Polynesie Francaise. 1957. Summary of annual report 1957. Unpublished. 1-5.
- 2141 Unknown. 1969. D - Activite de la section filarose. Unpublished. 54-72.
- 2142 Malarde, Louis. 1965. Faculte mixte de medecine et de pharmacie de rennes section medecine. Unpublished. 2-41.
- 2143 Unknown. 1964. Tableau no. 2: resultats des enquetes cliniques filariennes pratiques a Tahiti en 1949, 1958 et 1964. Raw data. Unpublished. 1-6.

- 2144 Institut de Recherches Medicales "Louis Malarde."
1973. Etude statistiques de l'enquete clinique et
biologique effectuees dan les zones pilotes de
Paea (KM 24 A 28), de Hitiaa (KM 36) de Tiarei (KM 22)
de Faaone (KM 50) en Septembre - Octobre 1973.
Raw data. Unpublished. 1-4.
- 2145 Unknown. 1954. La lutte antifilarienne dans les
etablissements francais de l'Oceanie. Unpublished.
1-14.

BIBLIOGRAPHY

FRENCH POLYNESIA: SOCIETY ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2026	Kessel, John F. 1971. Review of the filariasis control programme in Tahiti from November 1967 to January 1968. Bull Wld. Hlth. Org. 44: 783-794.
2033	Rosen, Leon. 1955. Observations on the epidemiology of human filariasis in French Oceania. American Journal of Hygiene. 61 (2): 219-248.
2035	Beye, H. K., S. A. Edgar, R. Mille, J. F. Kessel and Ben Bambridge. 1952. Preliminary observations on the prevalence, clinical manifestations and control of filariasis in the Society Islands. Amer. Jour. Trop. Med Hyg. 1 (4): 637-661.
2038	Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #NPR/350/68: 1-44.
2048	Backhouse, T. C. and A. R. Woodhill. 1956. Further studies on the hospitality of some Scutellaris group and other mosquitoes towards <u>Wuchereria bancrofti</u> from New Caledonia. South Pacific Commission Technical Paper. #17: 1-4.
2049	Bonnet, David D. and Herald Chapman. 1958. Larval habitats of <u>Aedes polynesiensis</u> Marks in Tahiti and methods of control. Amer. Jour. Trop. Med. Hyg. 7: 512-518.
2057	Kessel, John F. 1957. Effective programme for the control of filariasis in Tahiti. Bull. Wld. Hlth. Org. 16: 633-664.

- 2060 Bonnet, David D., John F. Kessel, Jacques Kerrest and Herald Chapman. 1956. Mosquito collections and dissections for evaluating transmission of filariasis in Polynesia (Tahiti). Amer. Jour. Trop. Med. Hyg. 5: 1093-1102.
- 2064 Beye, H. K., J. F. Kessel, J. Heuls, G. Thooris and Ben Bambridge. 1963. Nouvelles recherches sur l'importance, les manifestations cliniques, et la lutte contre la filariose a Tahiti, Oceanie Francaise. Bull. Soc. Path. Exot. 46 (1): 144-163.
- 2118 Stone, Alan and Leon Rosen. 1952. New species of Aedes from Tahiti (Diptera: Culicidae). Proceedings Hawaiian Entomological Society. 14 (3): 425-428.
- 2138 Unknown. 1969. Raw data - Tahiti and Tubuai Islands - filariasis. Unpublished. 1-24.
- 2140 Institut de Recherches Medicales de la Polynesie Francaise. 1957. Summary of annual report 1957. Unpublished. 1-5.
- 2141 Unknown. 1969. D - Activite de la section filarose. Unpublished. 54-72.
- 2142 Malarde, Louis. 1965. Faculte sixte de medecine et de pharmacie de rennes section medecine. Unpublished. 2-41.
- 2145 Unknown. 1954. La lutte antifilarienne dans les etablissements francaise de l'Oceanie. Unpublished. 1-14.

F. Cook Islands

1. Human Data

Mosquito control measures were started in 1945. They were directed primarily at villages and had little effect on the human prevalence rates. MDA was started in January, 1956, and the most recent treatment efforts were initiated in April, 1968. The highest prevalence rates for Aitutaki and Rarotonga are presented in Map 41. The most recent prevalence rates can be found in Table 9.

2. Mosquito Data

Information on the role and bionomics can be found in Table 10. No detailed information on the geographic distribution of the various mosquito species present on the Cook Islands was extracted into the Disease Information System. Therefore, maps could not be compiled.

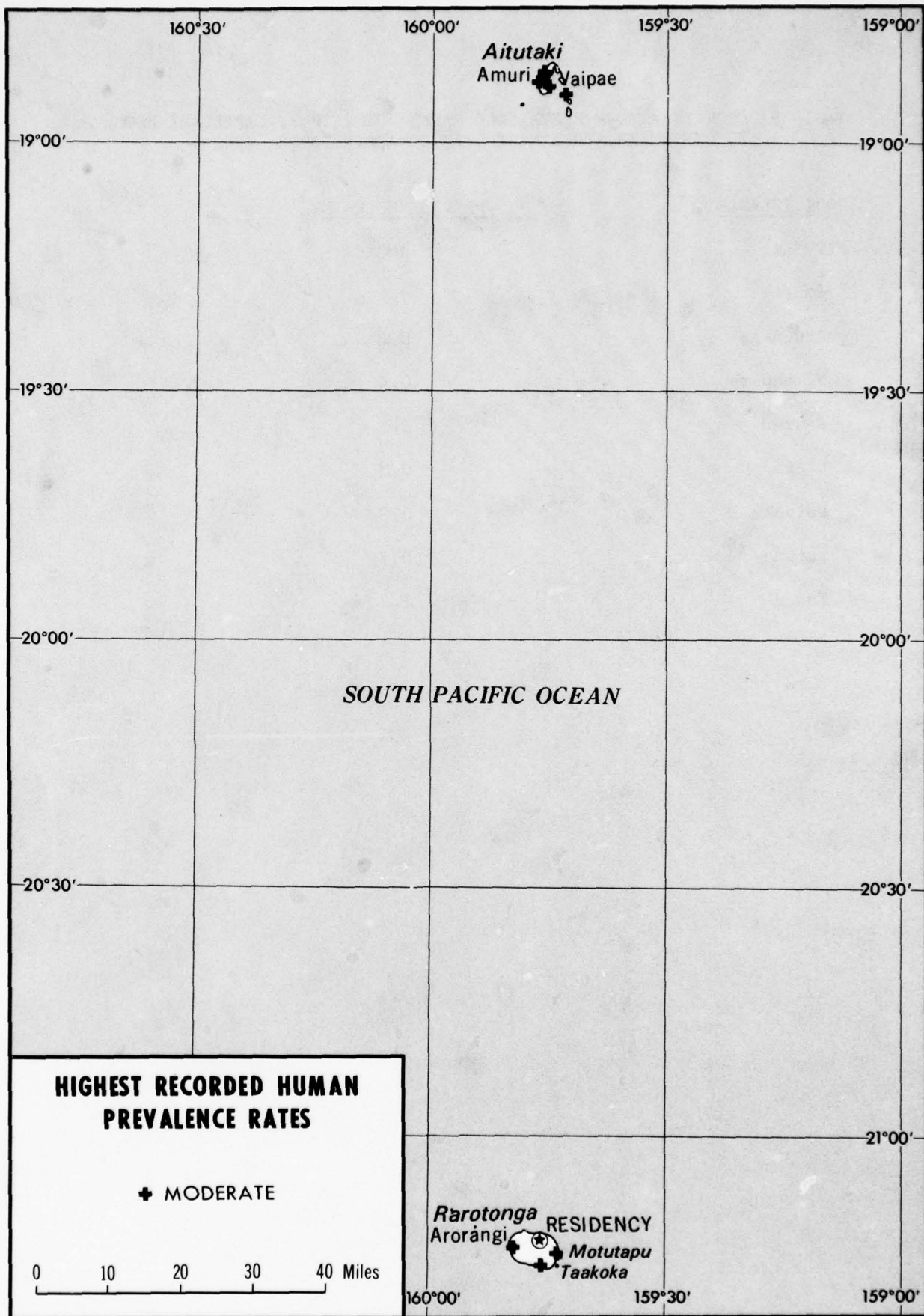


Table 9 COOK ISLANDS - PREVALENCE RATES JUNE, 1969, CAPILLARY BLOOD
20 CMM S'EAR, TREATMENT STARTED APRIL, 1968, (2023)

<u>COOK ISLANDS</u>	<u>PREVALENCE RATES</u>
AITUTAKI	0.8%
Amuri	0.5
Arutanga	0.8
Nikaupara	0.4
Reureu	2.1
Ureia	0.3
Vaipeka	0.8
Vaipae	0.7
Tautu	1.2

Table 10

COOK ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	non-periodic vector. (2036) all stages parasites found. (2121)	highest densities near and inside habitation. (2121)	in order of importance -- rain water cisterns, water storage drums, coconut shells, rat damaged coconuts, ant guards, tree holes. (2121) petrol drums, coconut husks, rat holes, beached canoes, try pot, truck tire. (2117)	daylight hours in brush and inside houses. (2117)	highest infection rates near and inside habitation. (2121)
* <i>Aedes pseudoscutellaris</i>	complete larval development in 13 days. (2097)	heavy population in bush areas. resting place -- marked preference for damp places shaded by densely foliated bushes. houses not used as resting places and mosquitoes enter only to feed. thick unkempt hedges are an important adult resting place. (2065)	small containers situated in fairly well shaded areas. artificial sites include: rusty tins, discarded coconut shells, empty bottles, jars, neglected roof gutters. natural sites include tree holes in the flamboyant tree, utu, wild hibiscus, puka and fallen leaves especially of the utu and wild hibiscus and fallen bracts of the coconut inflorescences. (2065)	associated with dull natural light -- dawn to 0800, 1600 to dusk. overcast days -- continues longer in morning and starts earlier in afternoon. very dull days -- biting may continue all day. no biting in full sunlight. light rain does not affect biting. heavy rainfall forces mosquito to remain in or return to resting place. (2065)	present throughout the islands where no control measures in effect. flight range -- healthy mosquito = maximum of 150 yards. fly against the breeze and seek shelter from strong winds. infected mosquito = maximum of 40 to 50 yards depending on the number of larvae present and stage of infection. (2065) April to November = population lowered probably due to insufficient rainfall to keep breeding sites effectively filled with water. December to March = marked rise in population due to sufficient rainfall to keep breeding sites filled with water. (2065) additional source: 2030.
* Major Vector					

Table 10 cont.

COOK ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes cooki</i>	suspected vector. (2042)		rain water containers, coconut shells, tins. (2042)		population high during summer months. (2042)
* <i>Aedes tongae</i>	assumed vector. (2053)	outdoor resting. (2053)			
<i>Culex annulirostris</i>	non-vector -- parasite larvae moribund or first stage only. (2121)		taro irrigation ditches, borrow pits, swamps and beached canoes. (2117)	common at night. (2117)	additional source: 2030.
<i>Culex fatigans</i>	non-vector, all first stage or moribund parasite larvae. (2121)		steel tanks with organic debris, petrol drums and beached canoes. (2117)		additional sources: 2030, 2097.
<i>Culex sitiens</i>			small rock pools of brackish or saline water. breeding places restricted to cliffs overhanging the sea coast. (2053)		comparatively rare. (2053)
<i>Stegomyia fasciata</i>	arrested development of filaria. (2097)				population = large numbers. (2097)

* Major Vector

BIBLIOGRAPHY

COOK ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2023	Williams, J. 1969. Filariasis surveys - April 1968 & June 1969. Raw data from author - Dr. Desowitz. 1-6.
2032	Otto, Gilbert F. and Leo A. Jachowski Jr. 1955. Problems in the epidemiology and control of filariasis. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/9: 1-10.
2038	Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
2047	Faine, S. and C. E. Hercus. 1951. Infections in Raratonga, Cook Islands. Trans. Roy. Soc. Trop. Med. Hyg. 45 (3): 345-346.
2053	Iyengar, M. O. T. 1958. Investigation on filariasis in Niue. South Pacific Commission Technical Paper. #30: 1-10.
2065	Davis, T. R. A. 1949. Filariasis control in the Cook Islands. N. Z. Med. Jour. 48 (266): 262-270.
2097	McKenzie, A. 1925. Observations on filariasis, yaws and intestinal helminthic infections in the Cook Islands with notes on the breeding habits of <u>Stegomyia pseudoscutellaris</u> , Trans. Roy. Soc. Trop. Med. Hyg. 19: 138-149.
2110	Simpson, E. J. B. 1957. Mass therapy in filariasis. Note on control in Niue Island. N. Z. Med. Jour. 56: 136-137.
2116	Lambert, S. M. 1926. Health survey of the Cook Islands, with special reference to hookworm disease. International Health Board of the Rockefeller Foundation. 27-40.

- 2121 Iyengar, M. O. T. 1957. Report on an investigation of filariasis in the Cook Islands. South Pacific Commission Technical Paper. #21: 1-13.
- 2125 Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.

BIBLIOGRAPHY
COOK ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper #125: 1-96.
2032	Otto, Gilbert F. and Leo A. Jachowski Jr. 1955. Problems in the epidemiology and control of filariasis. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL./9: 1-10.
2036	Manson-Bahr, Phillip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2053	Iyengar, M. O. T. 1958. Investigation on filariasis in Niue. South Pacific Commission Technical Paper. #30: 1-10.
2065	Davis, T. R. A. 1949. Filariasis control in the Cook Islands. N. Z. Med. Jour. 48 (266): 262-270.
2097	McKenzie, A. 1925. Observations on filariasis, yaws and intestinal helminthic infections in the Cook Islands with notes on the breeding habits of <u>Stegomyia psuedoscutellaris</u> , Trans. Roy. Soc. Trop. Med. Hyg. 19: 138-149.
2117	Laird, Marshall. 1954. Mosquitos of Aitutaki, Southern Cook Islands. Bull. Ent. Res. 45: 423-427.
2121	Iyengar, M. O. T. 1957. Report on an investigation of filariasis in the Cook Islands. South Pacific Commission Technical Paper. #21: 1-13.
2125	Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.

G. Ellice Islands

1. Human Data

Mosquito control measures on Vaitupu began with spraying in 1957 which was continued until 1960. In 1959, the underbrush was cleared. On Funafuti, spraying was introduced in 1961 along with treatment measures. Treatment was re-introduced in 1972. On Vaitupu, treatment was first introduced in 1959 and re-introduced in 1974. The geographic distribution of the highest prevalence rates can be found in Map 42. The majority of the rates were in the high (greater than 50.0%) range. It should be noted, however, that these prevalence rates were taken from a survey conducted in 1920 and 1921. The most recent prevalence rates can be found in Table 11. During World War II, the United States Marines occupied Funafuti, but they did not occupy Vaitupu. It has been suggested that the Marines altered the epidemiological situation by the introduction of improved sanitation measures, spraying and the use of drugs. Unfortunately, there is no information in the Disease Information System that will support or disclaim this assertion. The prevalence rates for Funafuti have generally been slightly lower than Vaitupu. However, when control and treatment measures were introduced, no survey was conducted in which the prevalence rates could be definitely related to alterations of the environment.

2. Mosquito Data

Information on the role and bionomics is presented in Table 12. The geographic distribution of the various mosquito species for which detailed information was available can be found in Maps 43 to 48.

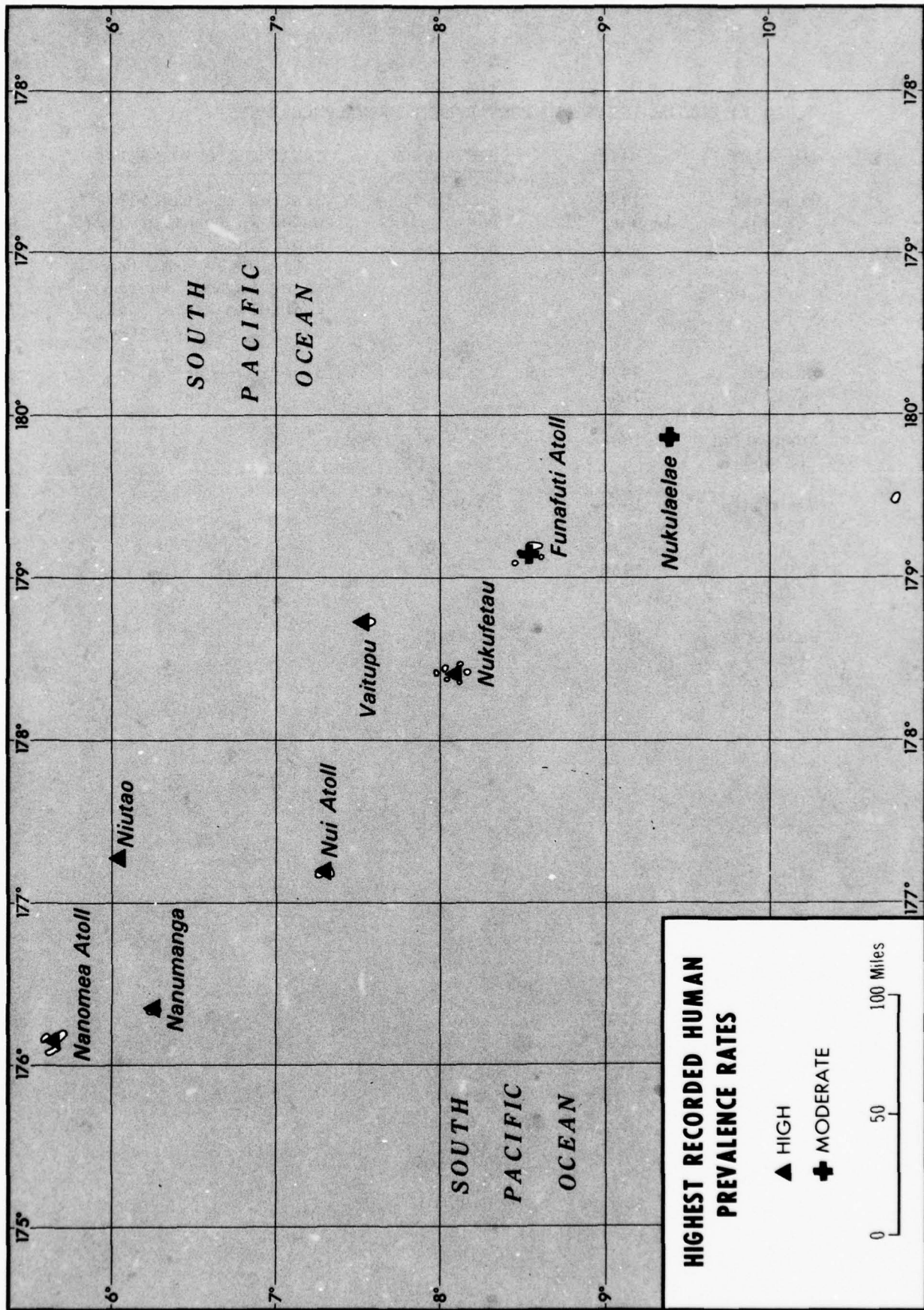


Table 11 ELLICE ISLANDS - MOST RECENT PREVALENCE RATES

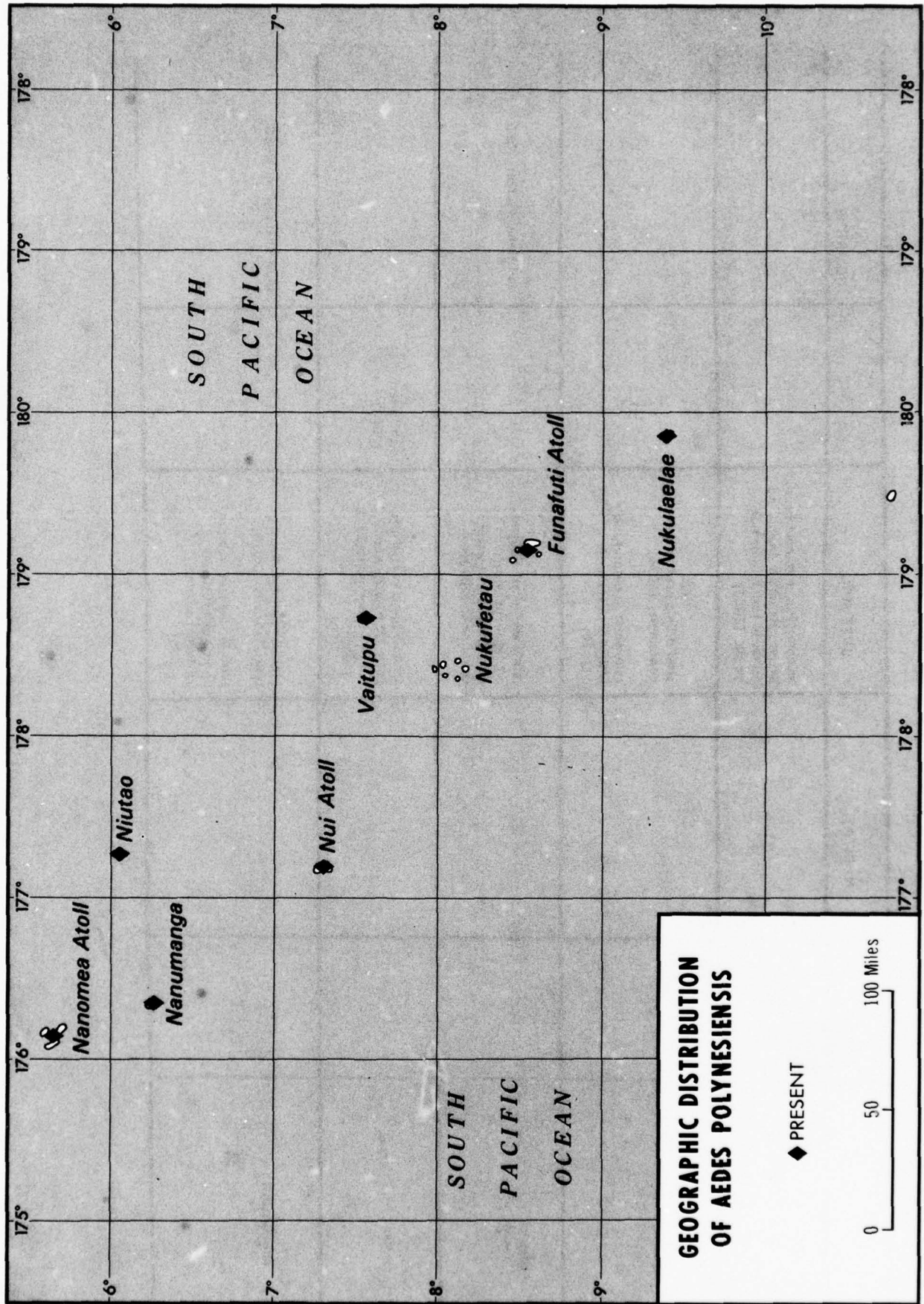
<u>LOCATION</u>	<u>DATE</u>	<u>PREVALENCE</u>	<u>TREATMENT INFORMATION</u>
Funafuti (2135)	1974 January 30	3.7%	Started in July, 1972 ended in December, 1973. 4 of 5 positives in this survey came from other islands where control measures had not yet been adopted.
Vaitupu (2125)	1971 June	32.9	pre-treatment
Nukulailai (2146)	1968	9.9	
Nanumanga (2146)	1968	16.6	
Nui (2146)	1968	23.7	
Nukufetau (2146)	1967	27.0	

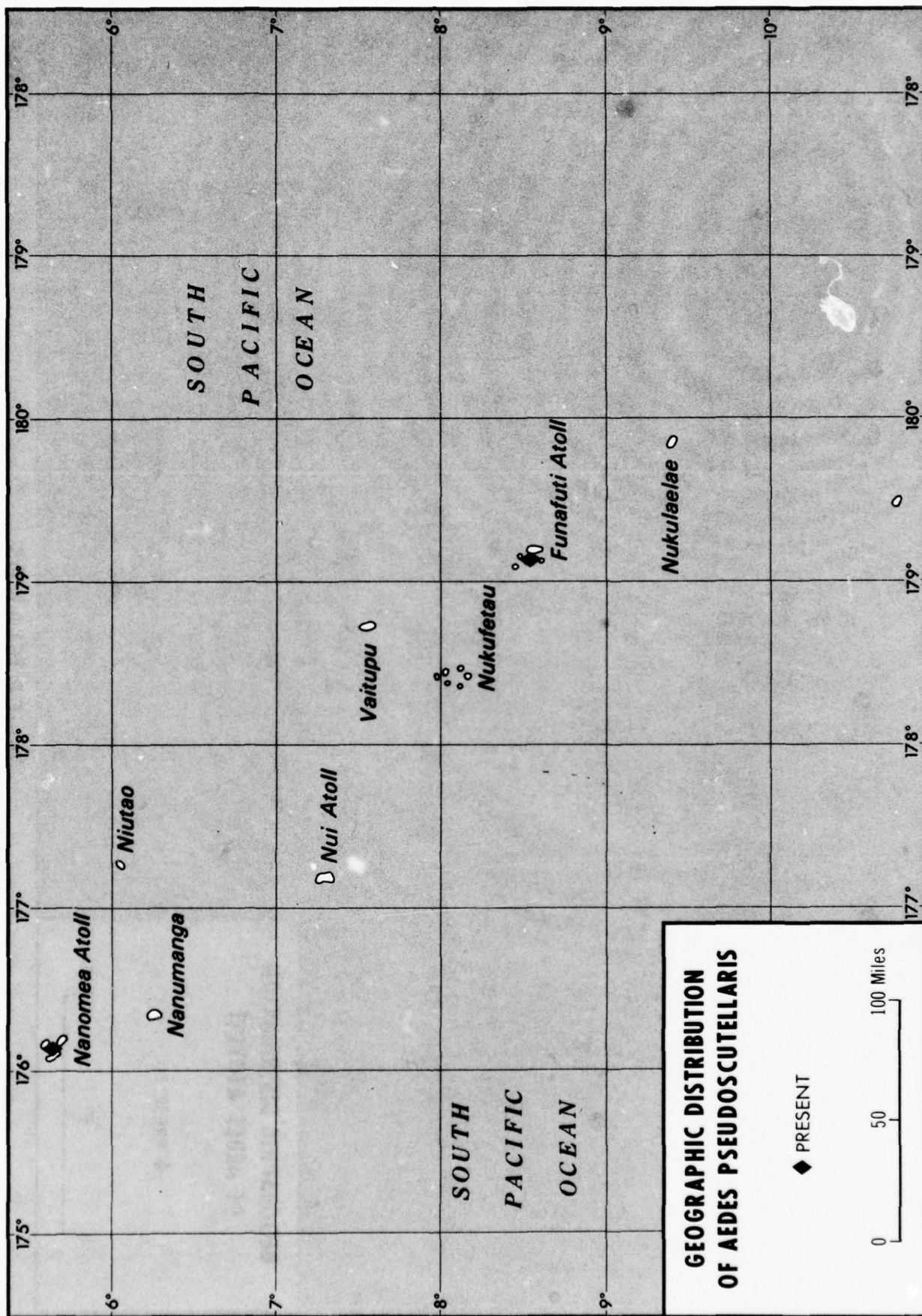
Table 12

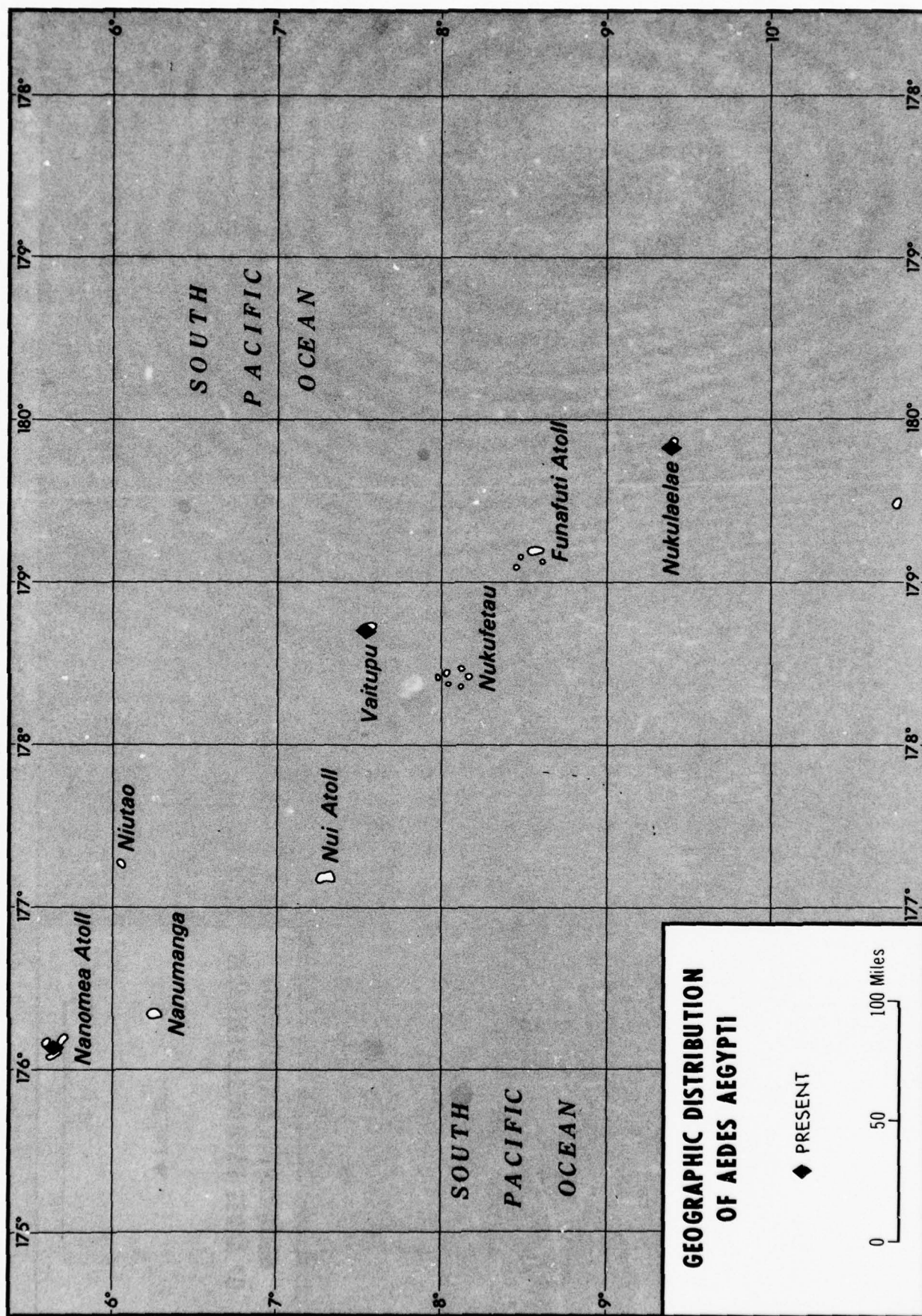
ELLICE ISLANDS — MOSQUITO DATA

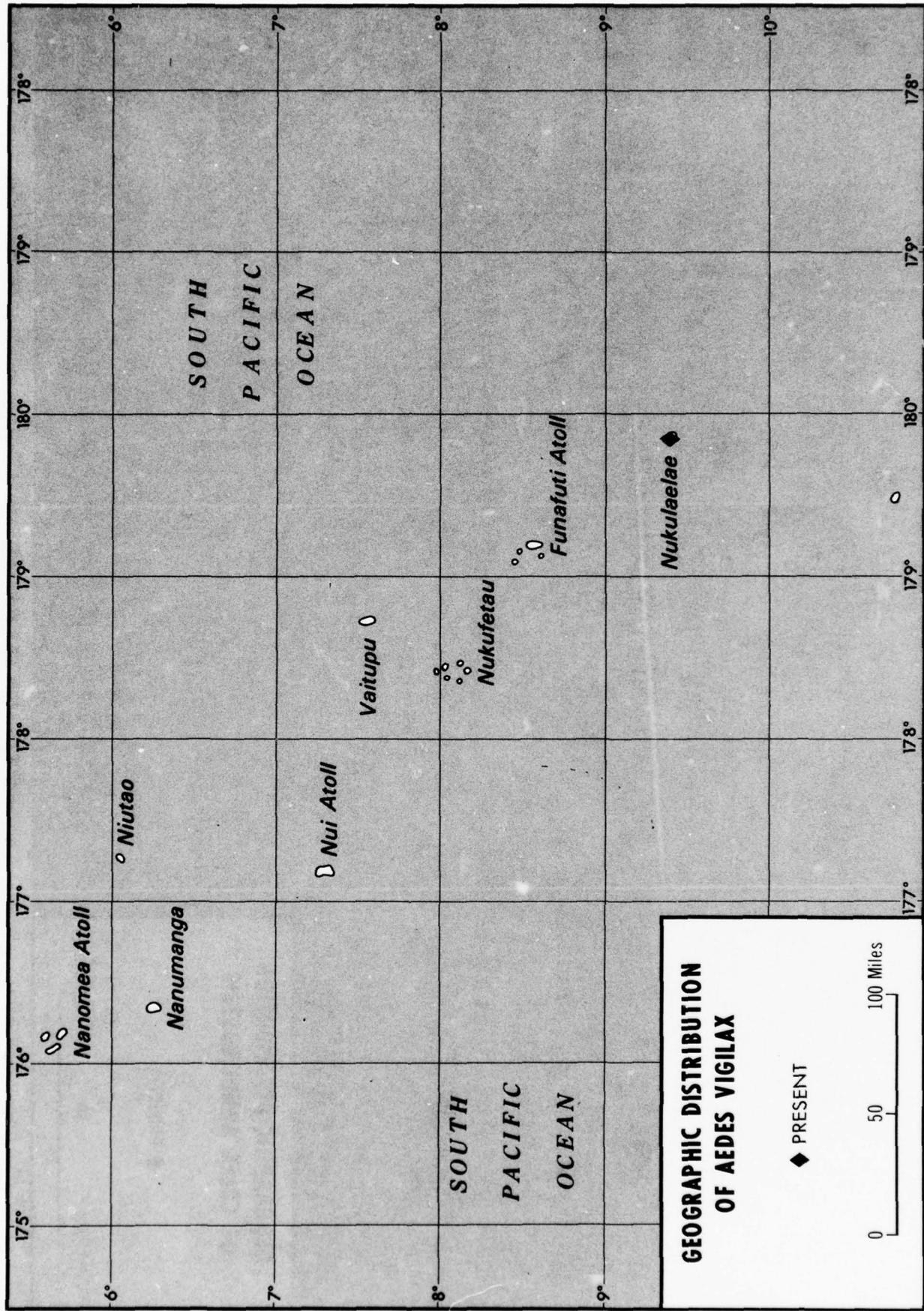
	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	non-periodic vector. (2036)		coconut husks in underbrush, water catchment drums. no larvae in leaf axils or tide pools. (2080)		
* <i>Aedes pseudoscutellaris</i>			steel drums used as water containers. (2030) rain water in natural and artificial containers. (2019)		
<i>Aedes aegypti</i>			rain water in natural and artificial containers. taro pits and rain water containers. (2019)		additional source: 2080.
<i>Aedes vexans</i>			shallow pools in taro pits. pH = 7.0 to 8.2. water temperature = up to 37°C. (2080)	night biter. (2080)	
<i>Culex annulirostris</i>			brackish seepage, water wells, taro pits. (2019) fresh or stagnant water in pools, road ruts and artificial containers. (2025)		additional source: 2080.

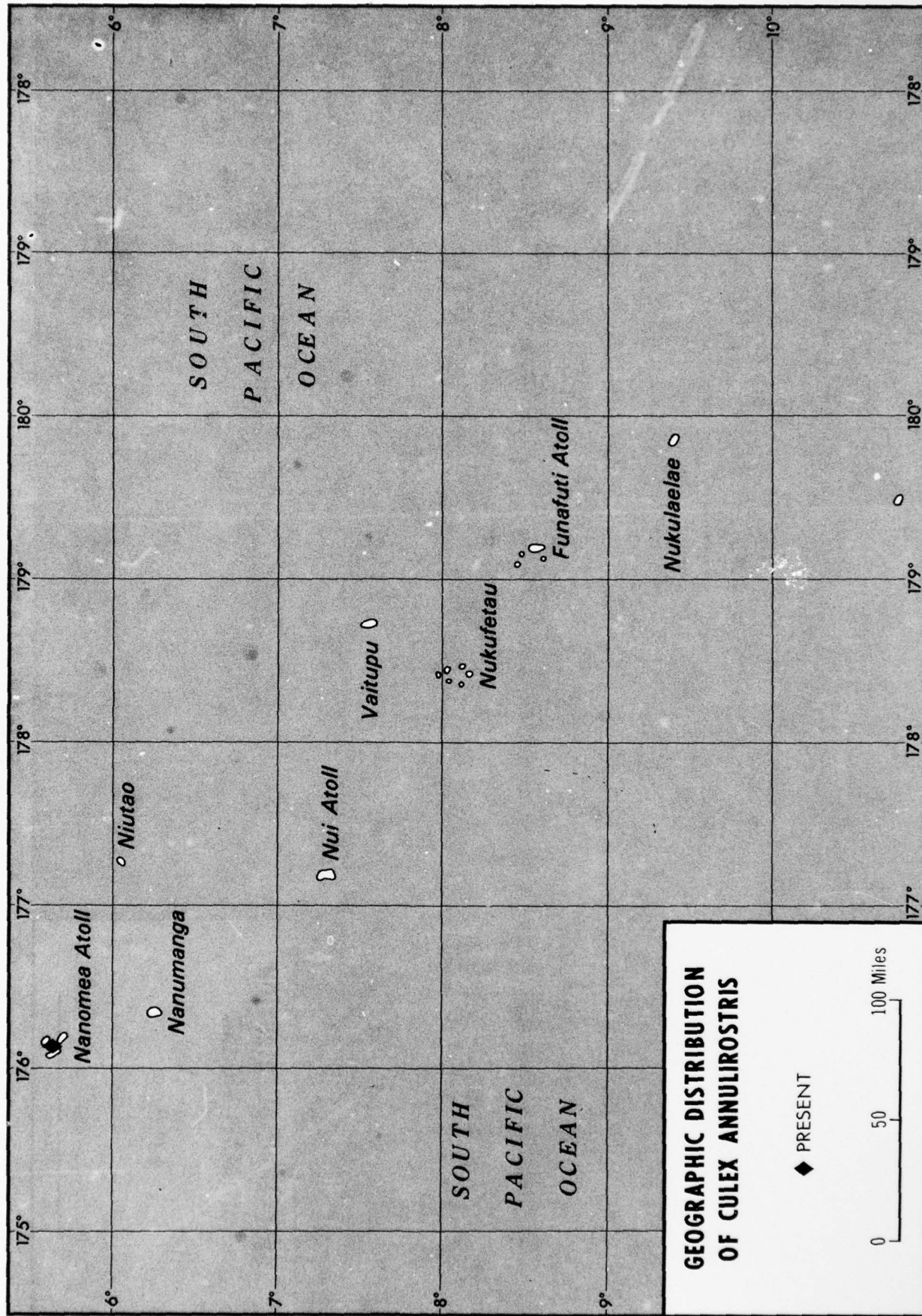
* Major Vector

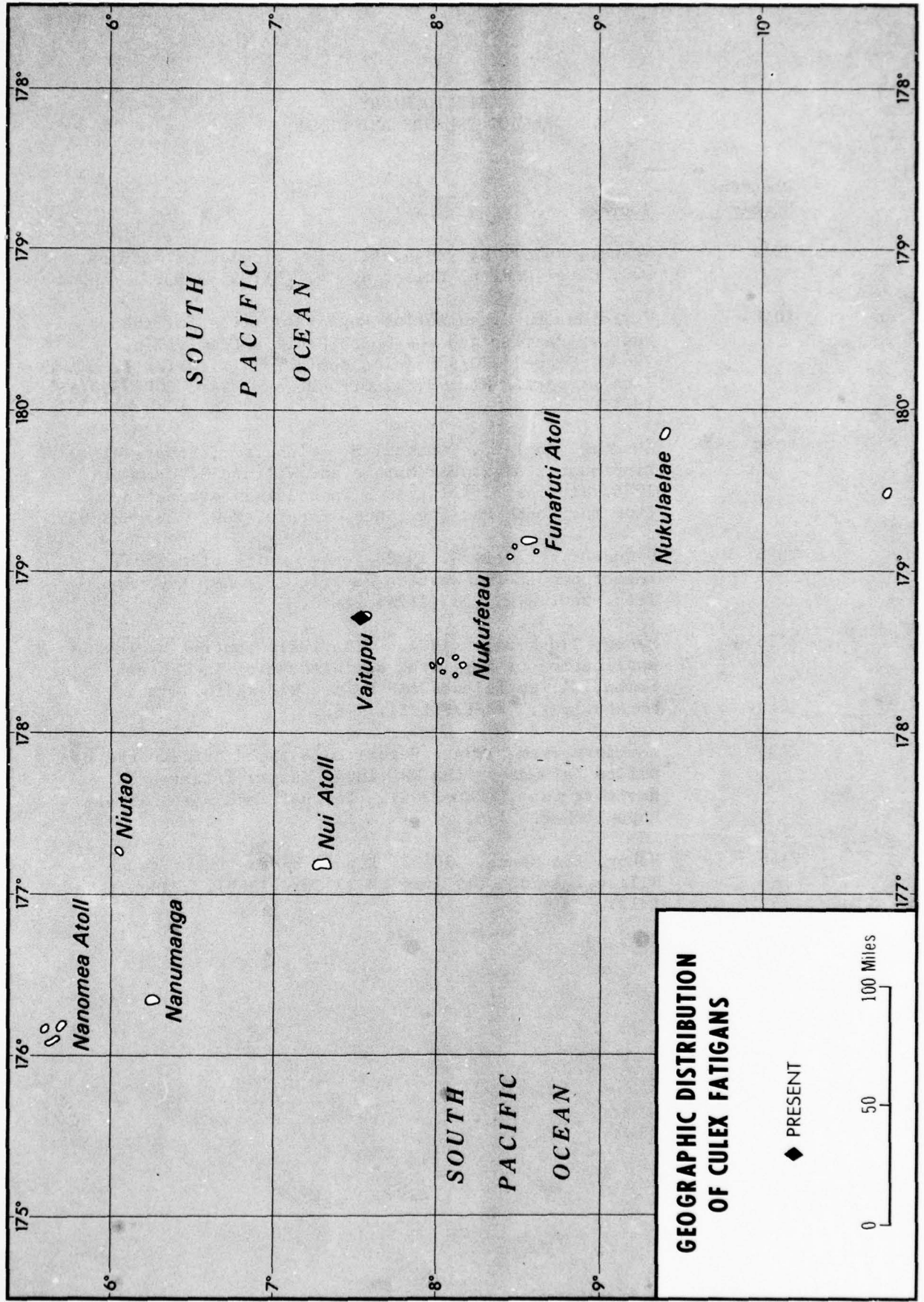












BIBLIOGRAPHY
ELLICE ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2019	Venner, Robert B. 1944. Filarial problem on Nanumea. U.S. Naval Medical Bulletin. 43 (5): 955-963.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2084	Goodman, Abel A., Emmanuel M. Weinberger, Stuart W. Lippincott, Alexander Marble and Willard H. Wright. 1945. Studies of filariasis in soldiers evacuated from the South Pacific. Ann. Intern. Med. 23: 823-835.
2095	O'Connor, Francis W. 1922. Some results of medical researches in the Western Pacific. Trans. Roy. Soc. Trop. Med. Hyg. 16 (1&2): 28-56.
2125	Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Nuie. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.
2135	Advisory Team, 1974. Report on a field trip to the Ellice Islands by the WHO intercountry filariasis advisory team (WPRO-2201). February and March 1974. Unpublished. 1-6.
2146	Maung, Tin Maung. 1969. Report on the visit to Ellice Island. (19 June to 27 June 1969). Unpublished. 1-13.

BIBLIOGRAPHY
ELLICE ISLAND AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2019	Venner, Robert B. 1944. Filarial problem on Nanumea. U.S. Naval Medical Bulletin. 43 (5): 955-963.
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper #125: 1-96.
2036	Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.
2080	Laird, Marshall. 1955. Notes on the mosquitos of the Gilbert, Ellice and Tokelau Islands, and on filariasis in the latter group. Bull. Ent. Res. 46: 291-300.
2125	Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.
2134	Advisory Team. 1973. Quarterly report of the WHO intercountry filariasis advisory team. Third quarter, 1973. Unpublished. 1-2.
2135	Advisory Team. 1974. Report on a field trip to the Ellice Islands by the WHO intercountry filariasis advisory team (WPRO-2201). February and March 1974. Unpublished. 1-6.
2146	Maung, Tin Maung. 1969. Report on the visit to Ellice Island. (19 June to 27 June 1969.) Unpublished. 1-13.

H. Tonga Islands

1. Human Data

As evidenced by comparing the highest human prevalence rates (Map 49) with the most recent prevalence rates (Table 13), no attempt at mosquito control or treatment efforts has been introduced. The prevalence data given here were obtained by membrane filter concentration of one ml. venous blood. This technique has consistently given 2 to 6 times higher (depending on the age group examined) rates than by conventional examination of 20 to 60 cmm. stained thick blood films. Prevalence figures for various age groups obtained in age-stratified surveys are shown in Tables 13, 13A, and 13B. These tables illustrate the need for age-stratified surveys and the necessity of applying the MFC technique to the younger age groups.

2. Mosquito Data

Information on the role and bionomics is presented in Table 14. The geographic distribution of the various mosquito species for which detailed information was available can be found in Maps 50 to 55.

There appears to be a remarkable diversity of the A. Scutellaris group within the Tongan Island chain (and probably elsewhere in Polynesia). The taxonomic status of these members -- whether they are strains or sibling species -- has not yet been fully determined.

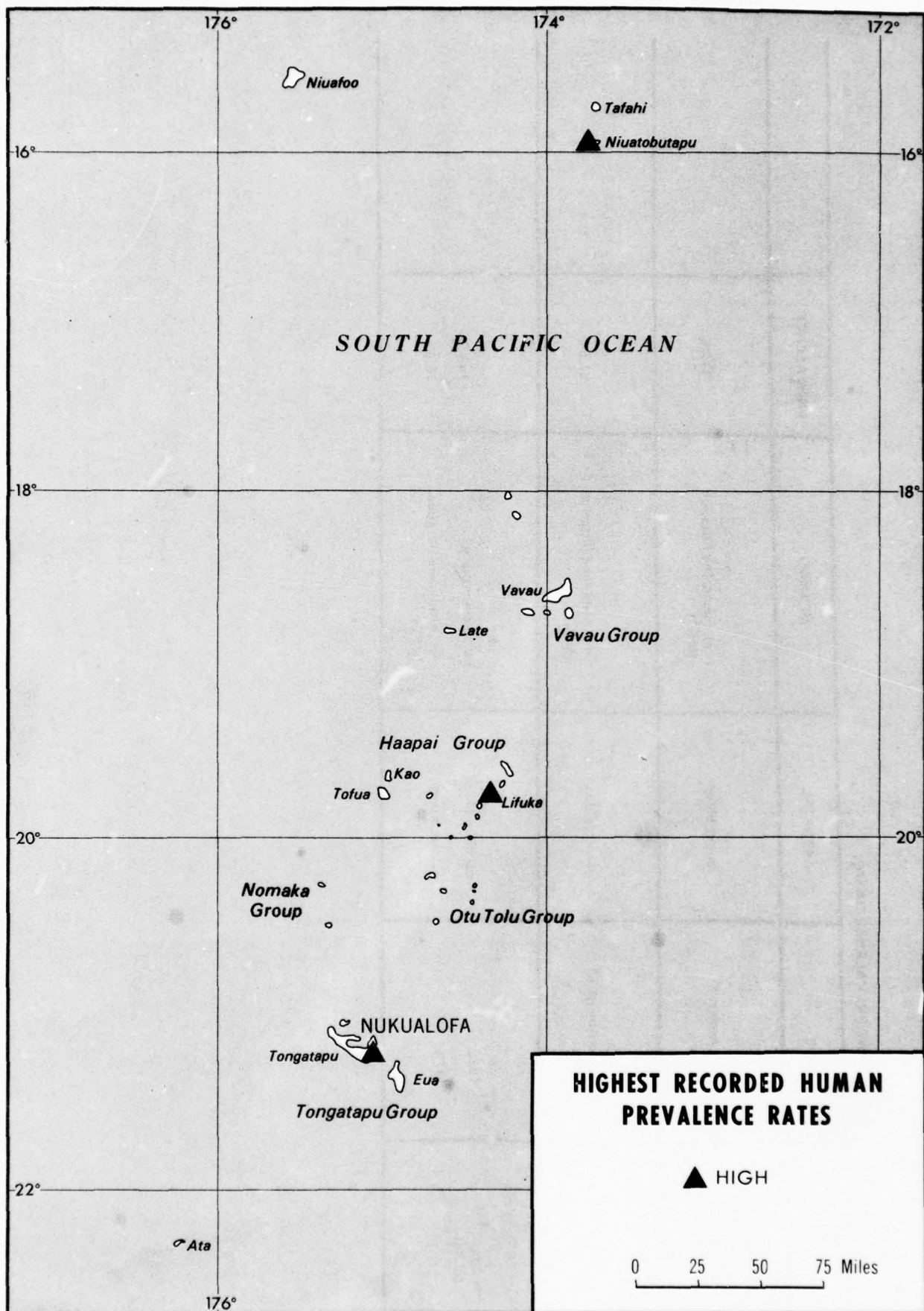


Table 13

TONGA ISLANDS — MOST RECENT PREVALENCE DATA

LOCATION	DATE	MATERIAL	METHOD	PREVALENCE
TONGATABU Te'ekiu (2088)	July 27 to August 5 1973	venous blood	1 ml. membrane filtration (MFC)	37.4%
HAAPAI Pangai (2088)	August 6 to August 13 1973	venous blood	1 ml. membrane filtration (MFC)	51.5%
NIUATOPUTAPU Hihifo (2036)	1970 1970	capillary blood venous blood	3 x 20 cmm smear 1 ml. membrane filtration (MFC)	16.0% 70.0%

Table 13A. Microfilaria rates and densities of Te'ekiu villagers,
Tongatapu, Tonga.

Age group (years)	No. in group	mf + ve % (no.)	No. mf + ve gt 25 mf/ml	No. mf + ve gt 25 mf/ml	lt 25 mf/gt 25 mf/ml (= MFC/60 mm blood film factor)
0-4	43	23.2% (10)	9	1	9.0
5-9	74	24.3% (18)	16	2	8.0
10-15	46	26.1% (12)	7	5	1.4
16-19	20	25.0% (4)	1	3	0.33
20-49	85	52.9% (45)	19	26	0.73
gt 50	29	75.9% (22)	7	15	0.47
TOTAL	297	37.4% (111)	59	52	1.1

Table 13B. Microfilaria rates and densities of villages of Pangai Island, Ha'apai Group, Tonga.

Age group (years)	No. in group	mf + ve % (no.)	No. mf + ve gt25 mf/ml	No. mf + ve gt25 mf/ml	st25 mf/gt25mf/ml (= MFC/60 mm blood film factor)
0-4	39	56.4% (22)	19	3	6.3
5-9	43	28.9% (13)	11	2	5.5
10-15	57	35.1% (20)	16	4	4.0
16-19	33	54.5% (18)	9	9	1.0
20-49	103	59.2% (61)	26	35	0.74
gt50	34	73.5% (25)	15	10	1.5
TOTAL	309	51.5% (159)	96	63	1.5

Table 14

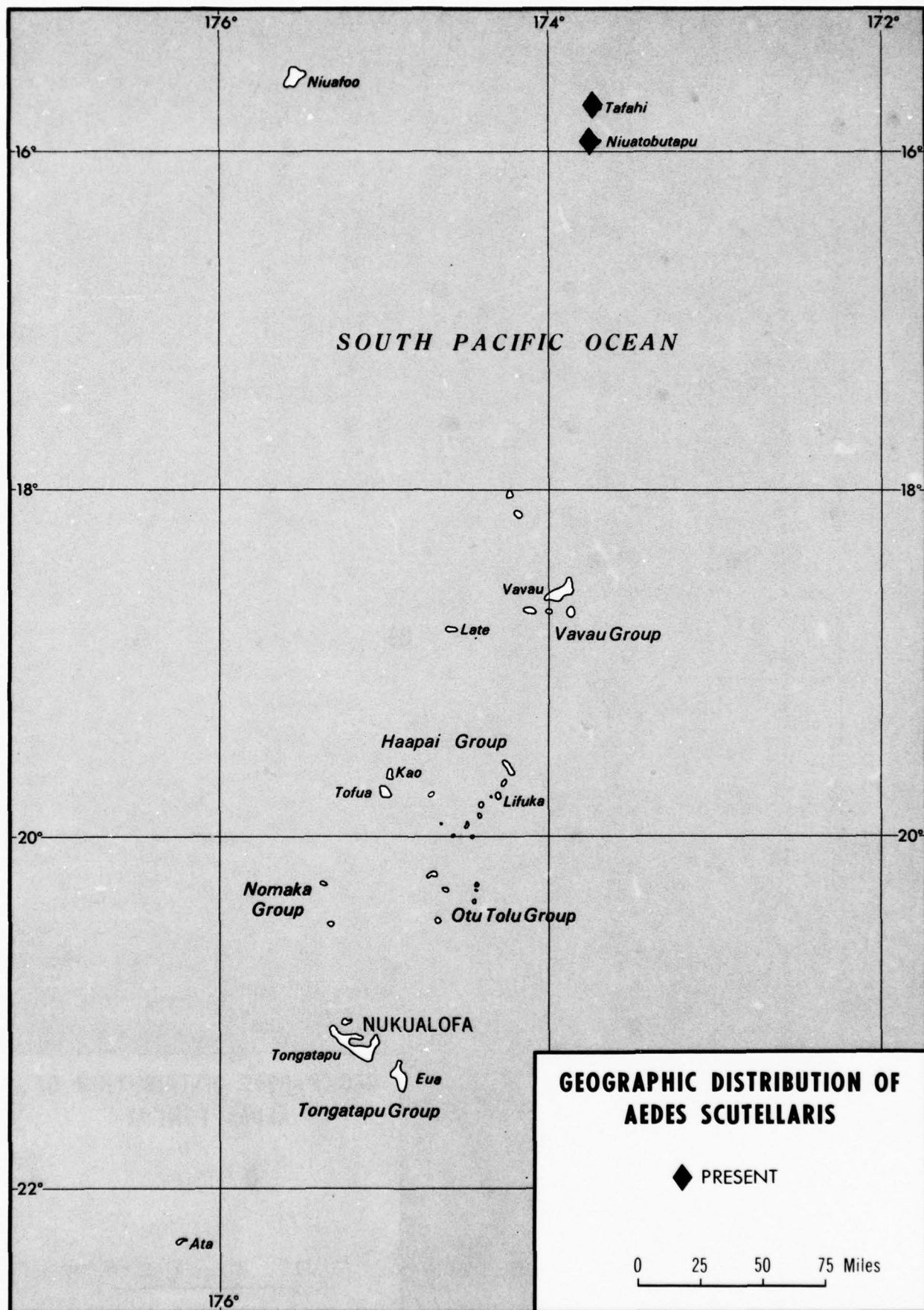
TONGA ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes scutellaris</i>	efficient vector. (2136) experimental infection very successful. (2052)				capable of autogeny -- development of eggs without first taking blood meal. (2052) additional source: 2014.
* <i>Aedes tabu</i>	major vector only in Tonga. (2042)	bush mosquito found resting in tree holes and other sheltered tree locations. not in houses. (2020)	rain water containers, coconut shells, discarded tins, tree holes. (2042) tree holes, artificial containers, coconut shells and spathes, leaf axils of taro. (2020)	day biter. (2042) day biter with peak at 1000 to 1200. (2020)	only reported in Tongatapu and Haapai group. (2020) number of eggs/female in a sample of 7 = 47.6. (2020) additional source: 2136.
* <i>Aedes tongae</i>	vector. (2015) suspected vector. (2042)				only reported in Haapai and Vavau groups. (2020)
<i>Aedes aegypti</i>					source: 2020.
<i>Aedes finlaya</i>					source: 2052.
<i>Aedes nocturnus</i>				vicious night biter. (2052)	additional source: 2020;
* Major Vector					

Table 14 cont.

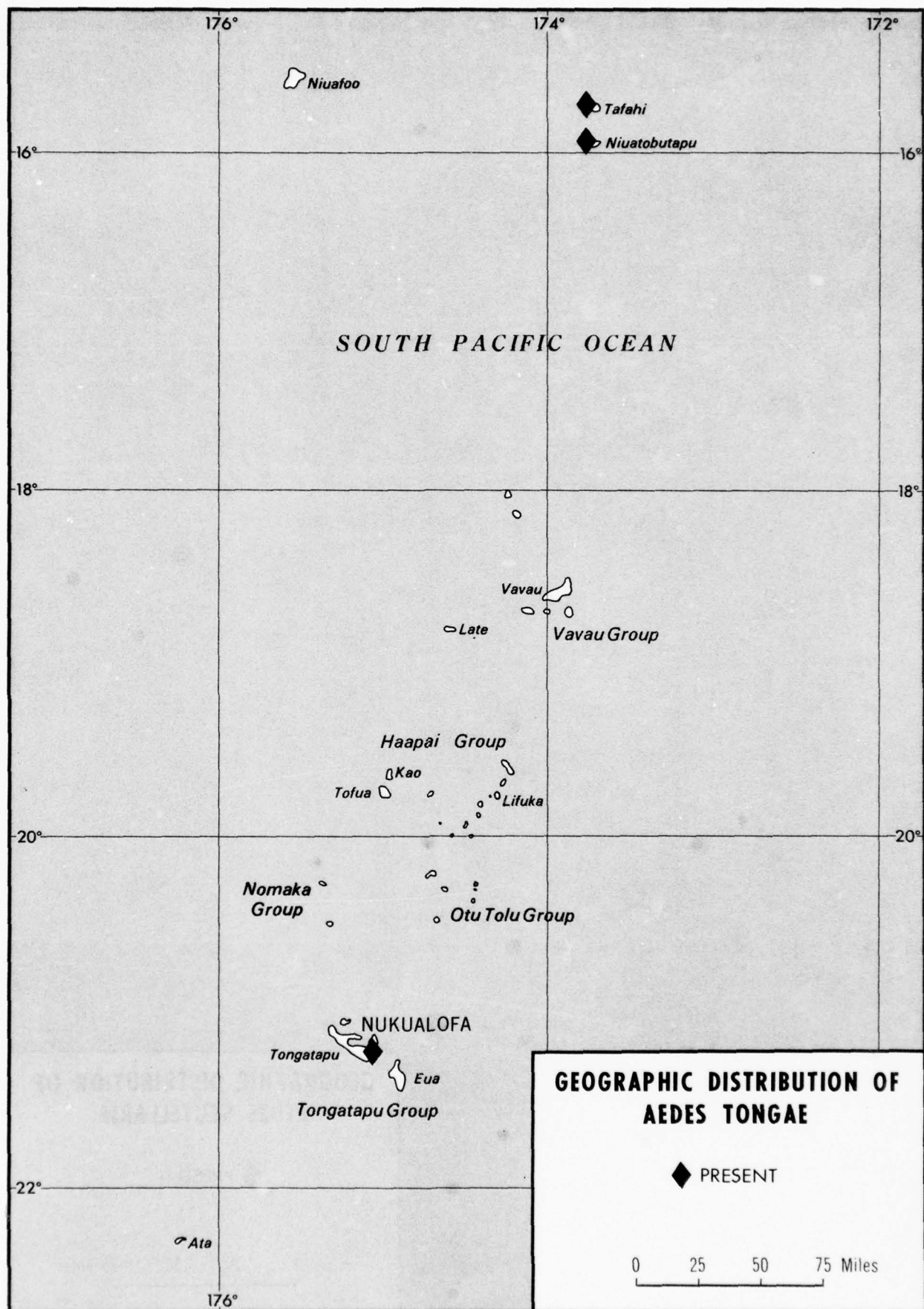
TONGA ISLANDS — MOSQUITO DATA

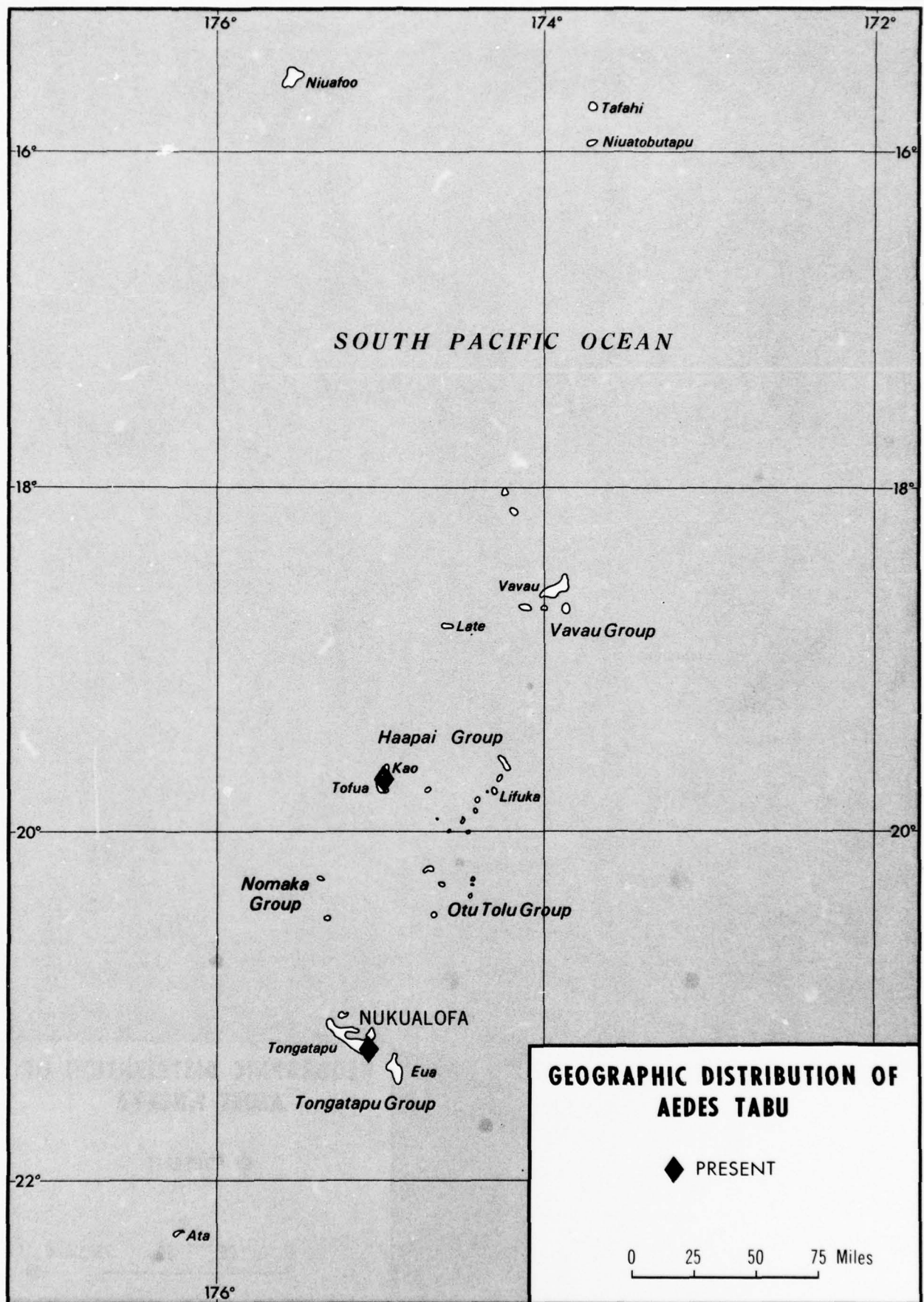
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes oceanicus</i>					sources: 2020, 2022.
<i>Culex annulirostris</i>					source: 2020.
<i>Culex fatigans</i>					source: 2020



TONGA ISLANDS

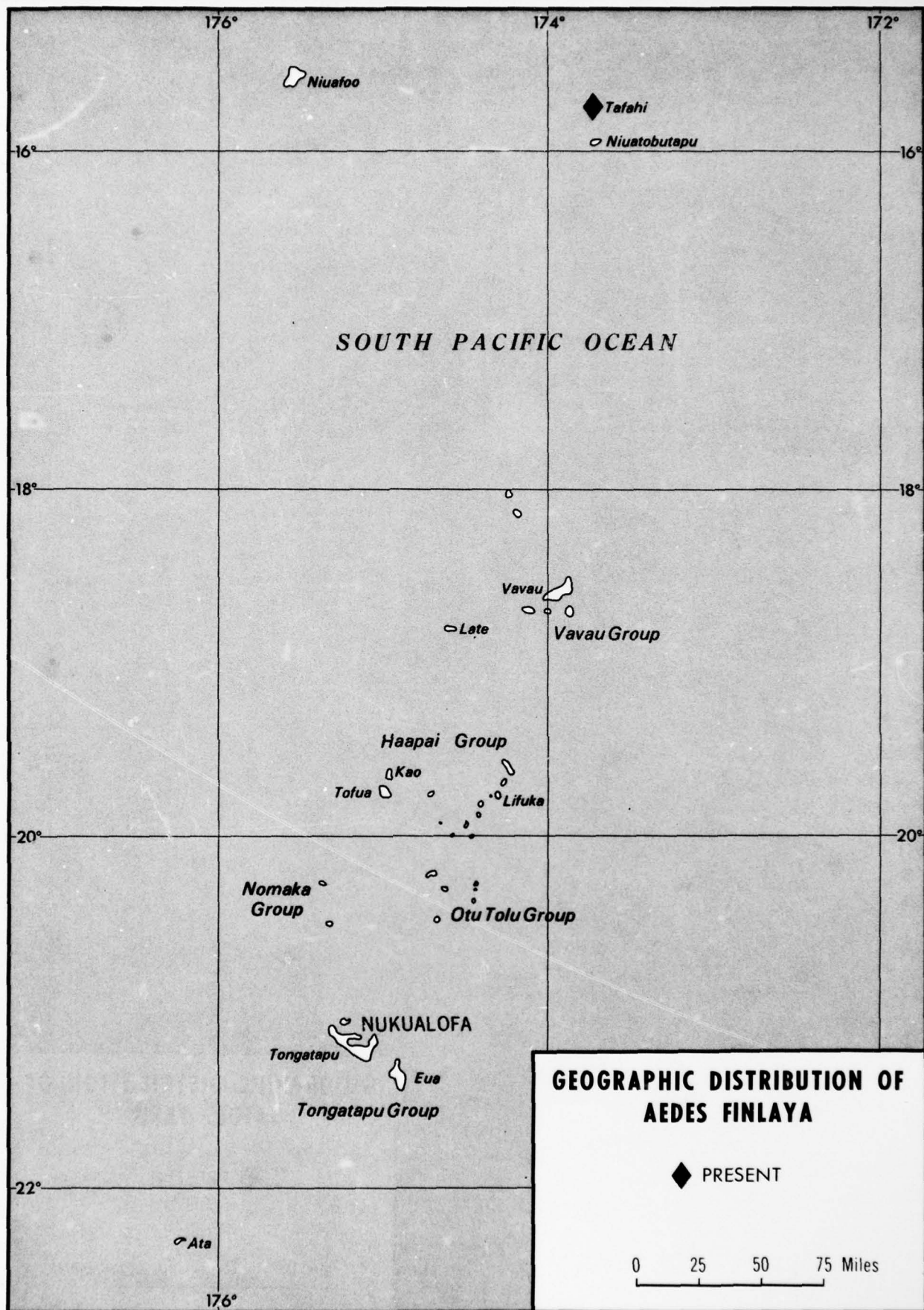
MAP 50





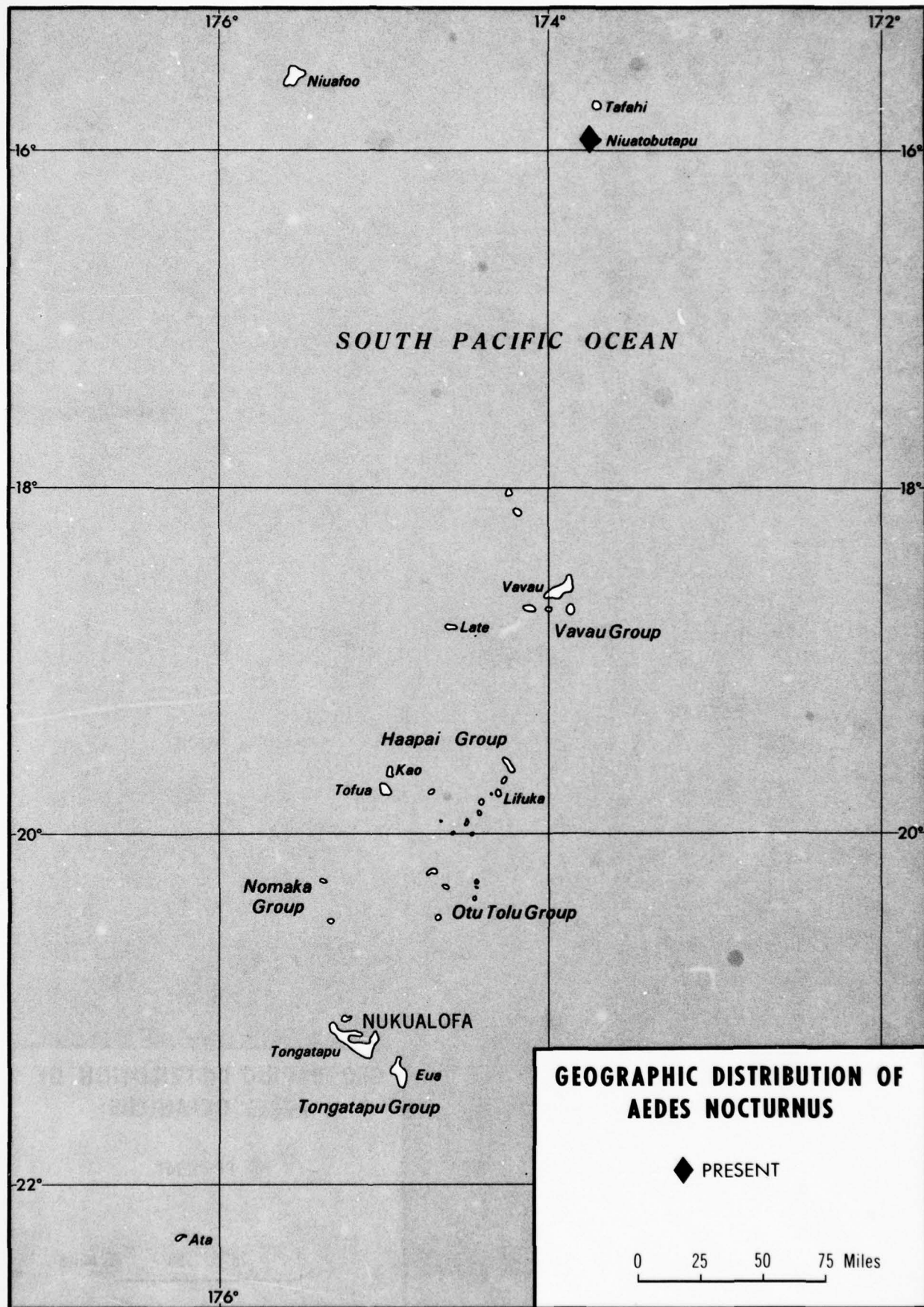
TONGA ISLANDS

MAP 52



TONGA ISLANDS

MAP 53



TONGA ISLANDS

MAP 54

BIBLIOGRAPHY

TONGA ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2007	Hitchcock, James C. Jr. 1969. UCLA mosquito studies in Tonga - 1968. Proceedings of the 56th annual meeting of the New Jersey Mosquito Extermination Association. 116-122.
2075	Swartzwelder, John Clyde. 1941-45. Filariasis bancrofti. Preventive medicine in World War II. Volume VII Communicable diseases. Washington, D.C.: Department of the Army. 563-71.
2084	Goodman, Abel A., Emmanuel M. Weinberger, Stuart W. Lippincott, Alexander Marble and Willard H. Wright. 1945. Studies of filariasis in soldiers evacuated from the South Pacific. Ann. Intern. Med. 23: 823-835.
2088	Desowitz, Robert S. and Steven J. Berman. 1973. Epidemiological investigations on filariasis in the South Pacific and Indonesia. Report on visits made from 18 July to 9 September 1973. Unpublished. WHO consultants. 1-48.
2136	Hitchcock, J.C. 1974. Filariasis surveys in the Kingdom of Tonga. Unpublished. 1-6.

BIBLIOGRAPHY

TONGA ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2007	Hitchcock, James C. Jr. 1969. UCLA mosquito studies in Tonga - 1968. Proceedings of the 56th Annual Meeting of the New Jersey Mosquito Extermination Association. 116-122.
2014	Hitchcock, James C. Jr. 1970. Evaluation of filariasis mosquito surveys based on the physiological age of the vector. Jour. Parasit. 56 (4): 149.
2015	Ramalingam, Shivaji and John N. Belkin. 1964. Vectors of sub-periodic bancroftian filariasis in the Samoa Tonga area. Nature. London. 201: 105-106.
2020	Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323.
2022	Hitchcock, J. C. Jr. 1971. Transmission of sub-periodic filariasis in Tonga by <u>Aedes oceanicus</u> Belkins. Trans. Roy. Soc. Trop. Med. Hyg. 65: 408-409.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2052	Hitchcock, J. C. 1970. Progress report - His Majesty King Taufa'Ahau Tupou IV Kingdom of Tonga. Unpublished. 1-3.
2136	Hitchcock, J. C. 1974. Filariasis surveys in the Kingdom of Tonga. Unpublished. 1-6.

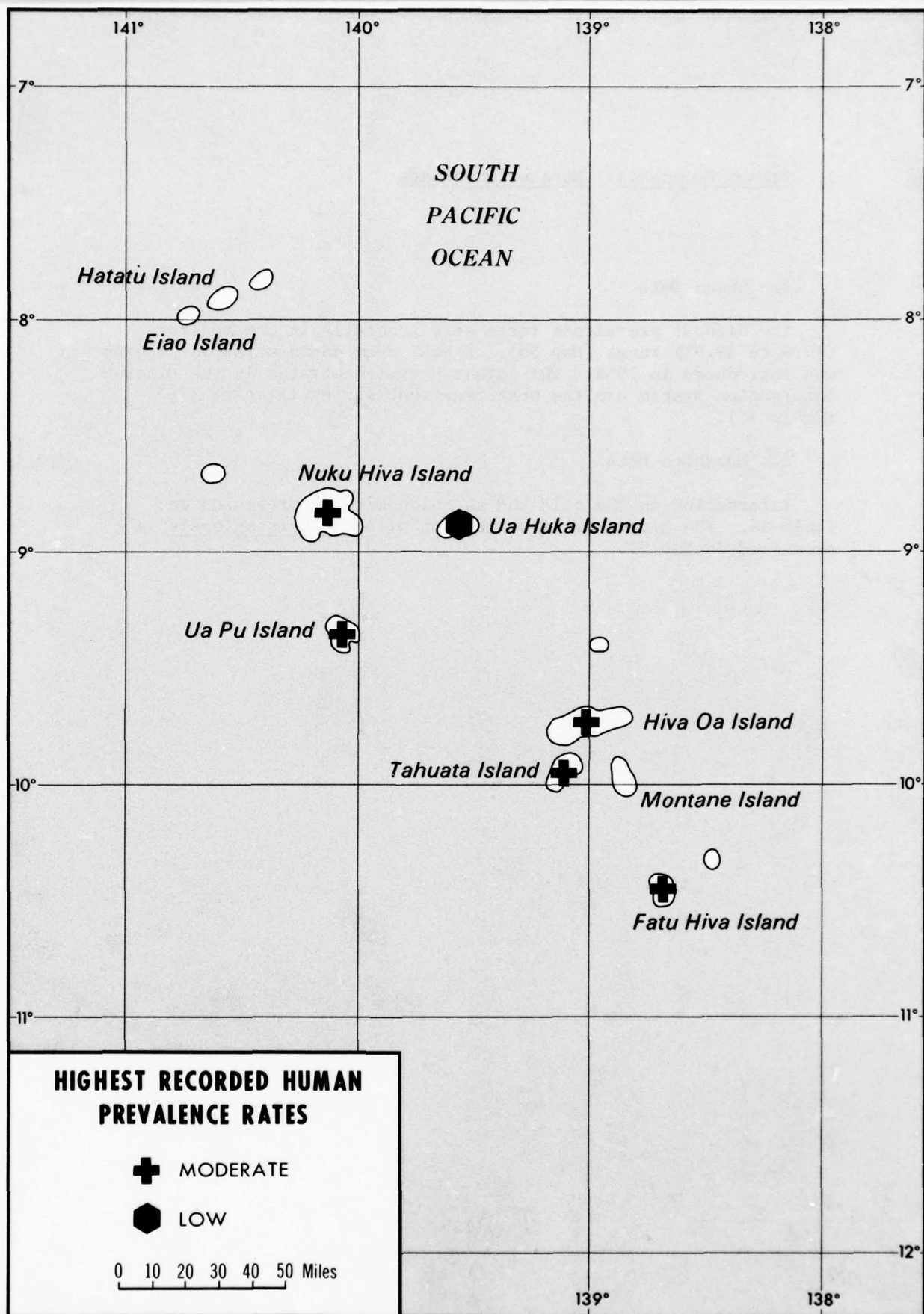
I. French Polynesia: Marquesas Islands

1. Human Data

The highest prevalence rates were generally in the moderate (10.0 to 49.9%) range (Map 56). A mass drug administration program was introduced in 1956. The latest prevalence rates in the Disease Information System are the post-treatment survey rates of 1957 (Table 15).

2. Mosquito Data

Information on the role and the bionomics is presented in Table 16. The geographic distribution of Aedes polynesiensis is presented in Map 57.



MARQUESAS ISLANDS

Table 15 MARQUESAS ISLANDS - Most Recent Human Prevalence Rates

Post Treatment Survey - 1957

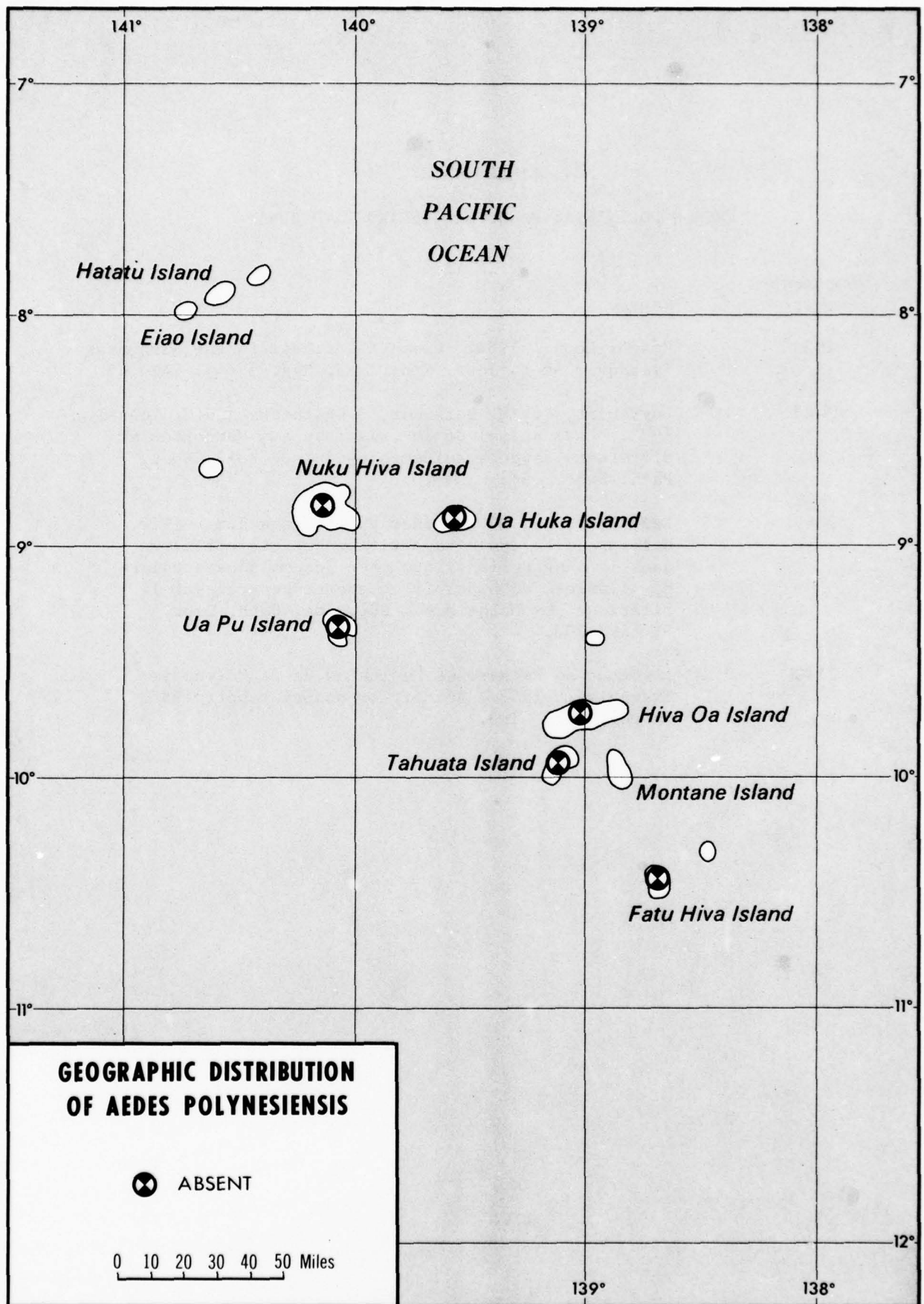
<u>LOCATION</u>	<u>PREVALENCE RATES</u>
MARQUESAS ISLANDS	
Ua Huka	18.1%
Fatu Hiva	13.5
Tahuata	11.1
Hiva Oa	6.4
Nuku Hiva	2.3
Ua Pou	1.1

Table 16

FRENCH POLYNESIA: MARQUESAS ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>					present in all 6 inhabited islands including Nuku Hiva, Ua Huka, Ua Pou, Hiva Oa, Tahuata, and Fatu Hiva. (2034)
* <i>Aedes pseudoscutellaris</i>					present from sea level to 885 meters. (2112)
<i>Culex fatigans</i>					source: 2112.

* Major Vector



MARQUESAS ISLANDS

MAP 57

BIBLIOGRAPHY

FRENCH POLYNESIA: MARQUESAS ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2034	Rosen, Leon. 1954. Human filariasis in the Marquesas Islands. Amer. Jour. Trop. Med. Hyg. 3 (4): 742-745
2043	Lagraulet, J., M. Barsinas, G. Fagneaux and M. Teahui. 1973. Etat actuel de la filariose aux Marquises et differents aspects epidemiologiques. Bull. Soc. Path. Exot. 66: 139-155.
2069	Lagraulet, J., M. Barsinas and G. Fagneaux. 1972. Heterogeneite de la repartition des microfilaires dans le sang peripherique chez les malades atteints de filariose de bancroft et apercu general sur la filariose aux Marquises. Bul. Soc. Path. Exot. 5: 698-703.
2140	Institut de Recherches Medicales de la Polynesie Francaise. 1957. Summary of annual report 1957. Unpublished. 1-5.

BIBLIOGRAPHY

FRENCH POLYNESIA: MARQUESAS ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2034	Rosen, Leon. 1954. Human filariasis in the Marquesas Islands. Amer. Jour. Trop. Med. Hyg. 3 (4): 742-745.
2112	Edwards, F. W. 1933. Mycetophilidae, culicidae and chironomidae and additional records of simuliidae, from the Marquesas Islands. Bernice P. Bishop Museum - Bulletin. #114: 85-92.

J. New Caledonia and Loyalty Islands

1. Human Data

In the articles extracted in the Disease Information System, there is no mention of the adoption of either mosquito control or treatment measures. The latest survey, in fact the only survey supplying detailed information, was taken in 1955 and 1956. In 1975, Lagraulet et. al. noted that bancroftian filariasis has been present in New Caledonia for many years, first having been reported in 1858. The focus in New Caledonia is reported now to be practically extinguished ("pratiquement eteint"), but it is noted that the vector Ae. vigilax is present in undiminishing numbers and recent migrants from other endemic areas could reactivate transmission. The prevalence rates were generally in the moderate (10.0 to 49.9%) range (Map 58).

2. Mosquito Data

Information on the role and the bionomics is presented in Table 17. Information on the geographic distribution of the various mosquito species can be found in Maps 59 to 67. Aedes vigilax appears to be the main vector.

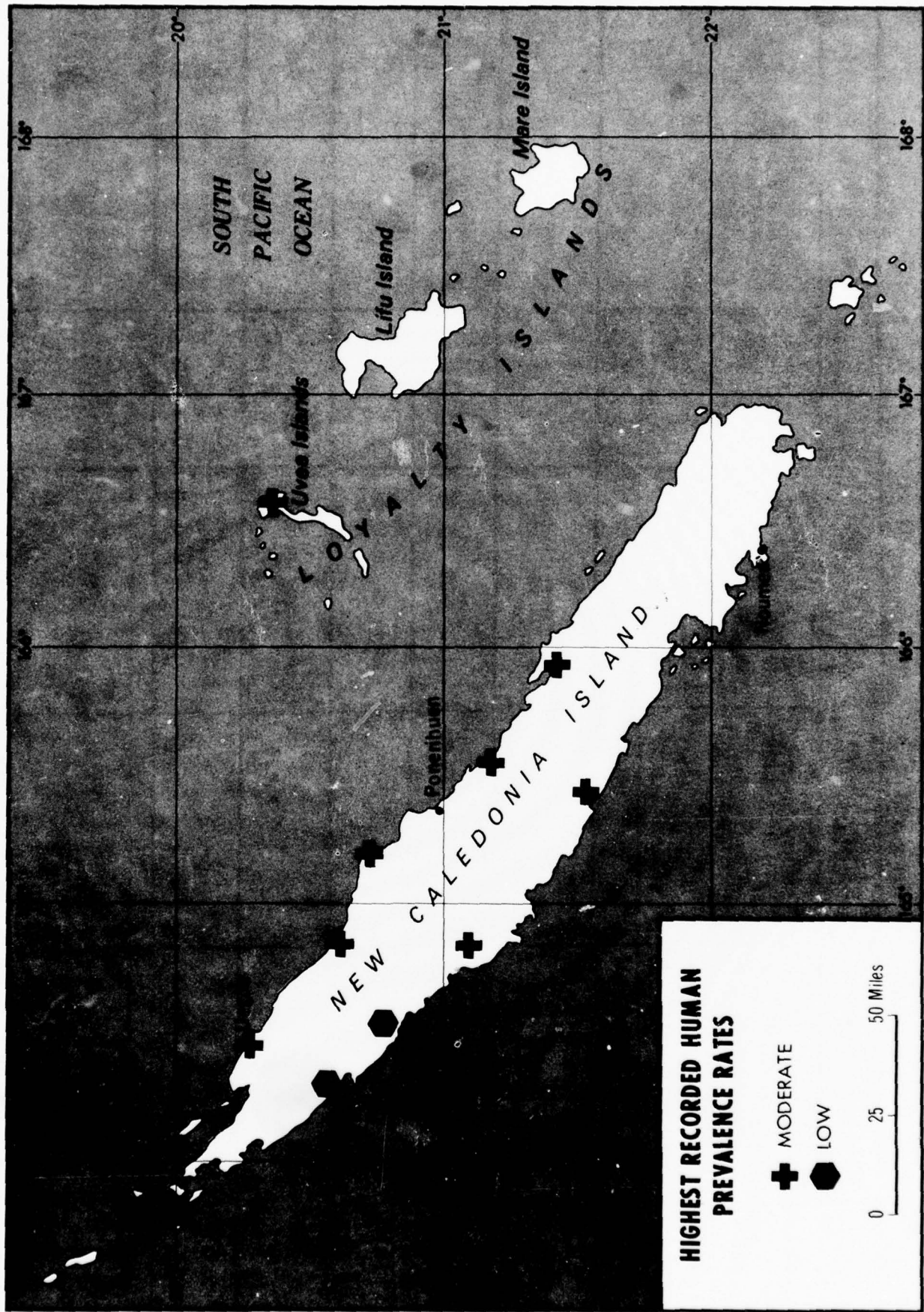


Table 17

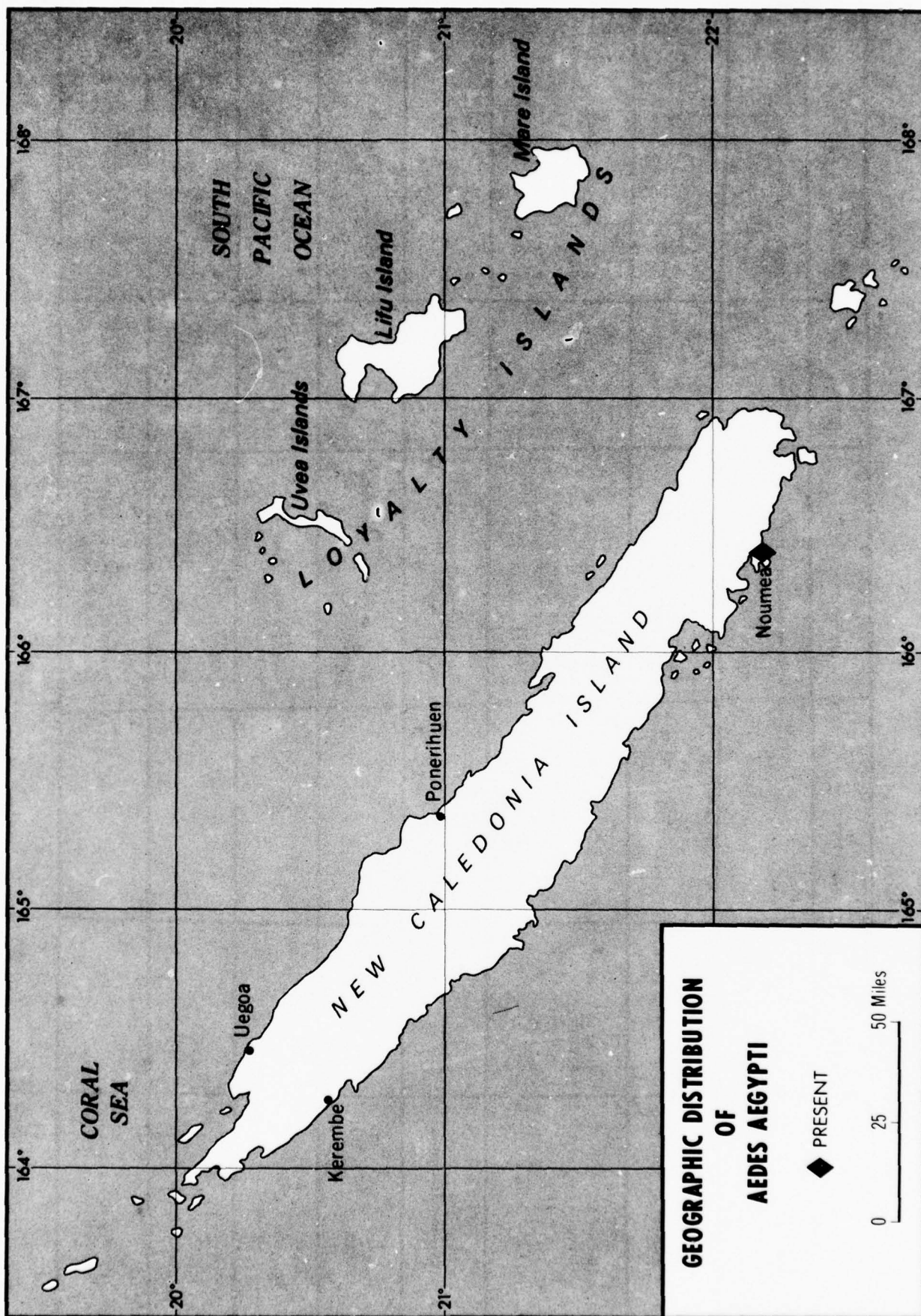
NEW CALDEONIA AND LOYALTY ISLANDS — MOSQUITO DATA

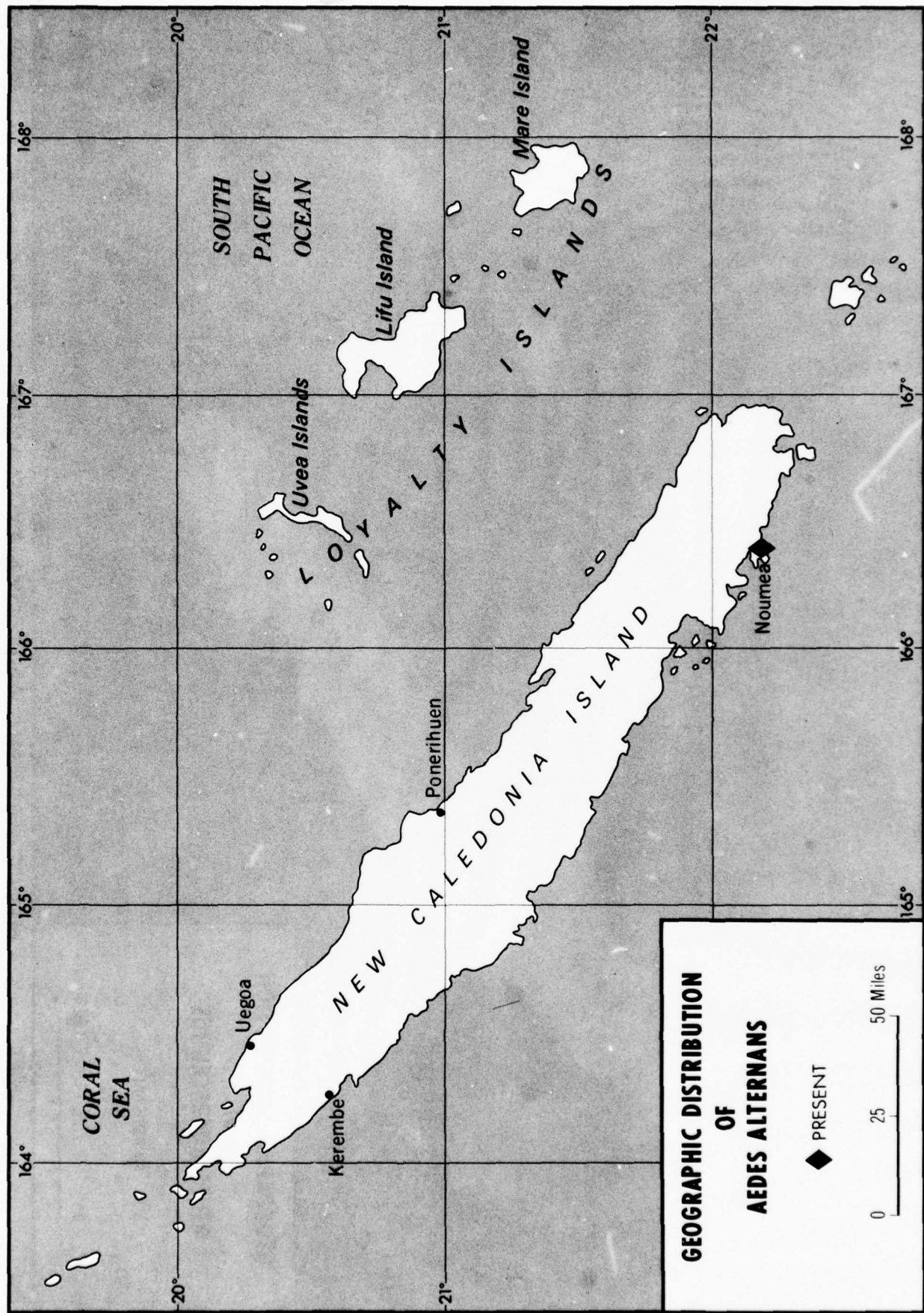
	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes vigilax</i>	major vector. (2042) major importance is as a pest mosquito. (2025) normal development at all stages. (2081)	rests outdoors during day in grass and low vegetables. (2042)	brackish water, rock holes fresh water pools. (2042) brackish and tide water pools. (2025)	daytime. (2042)	density highest during summer months. strong flyer. (2042)
<i>Aedes aegypti</i>			fresh or foul water in any artificial container. (2025)		additional source: 2081.
<i>Aedes alternans</i>			brackish pools. (2025)		additional source: 2045.
<i>Aedes kermoganti</i>			brackish pools. (2025)		
<i>Aedes notoscriptus</i>			rock holes, tree holes, tin cans. (2025)		
<i>Aedes vexans</i>			fresh water pools and ruts. (2025)		additional source: 2045.
* Major Vector			138		

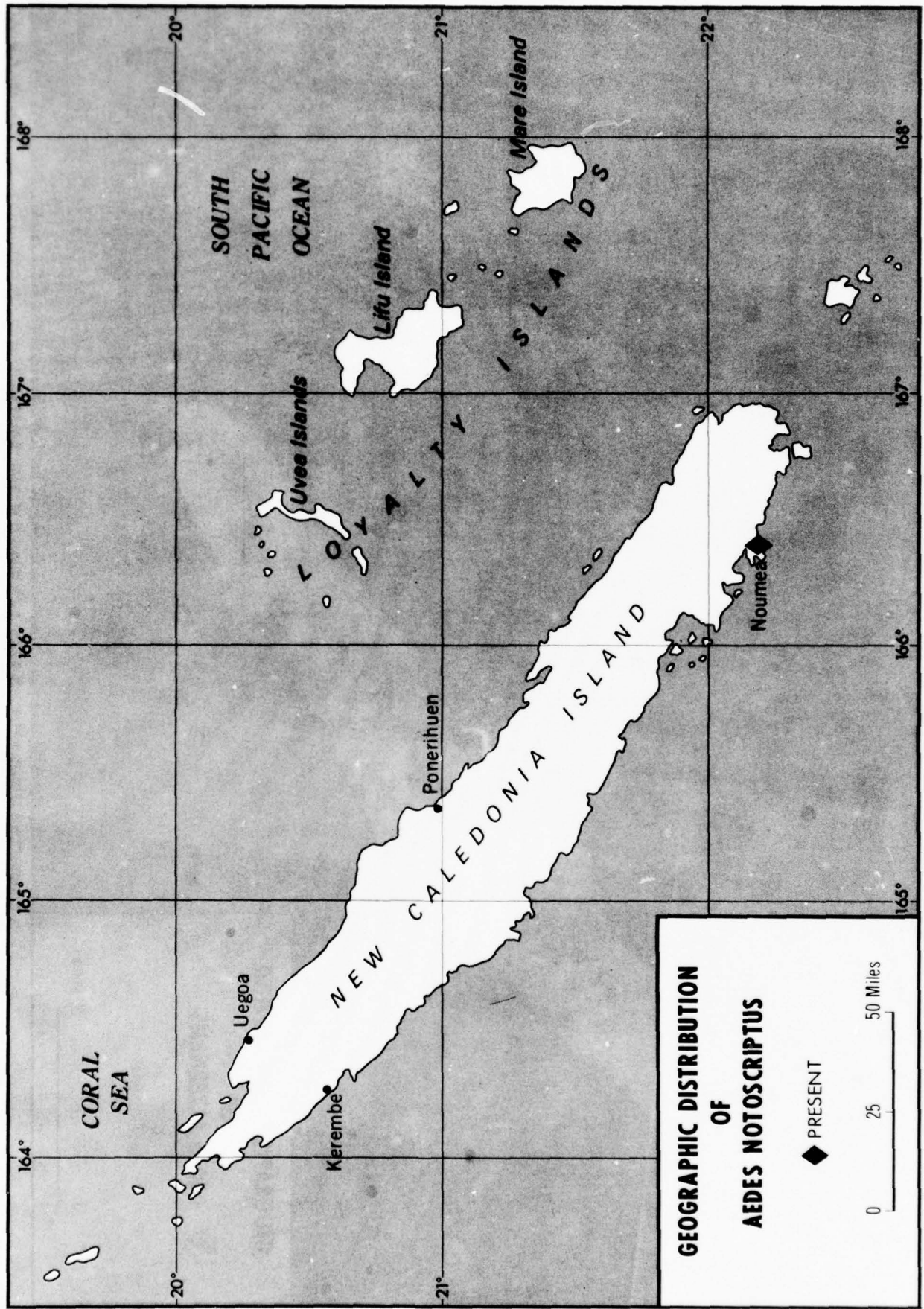
Table 17 cont.

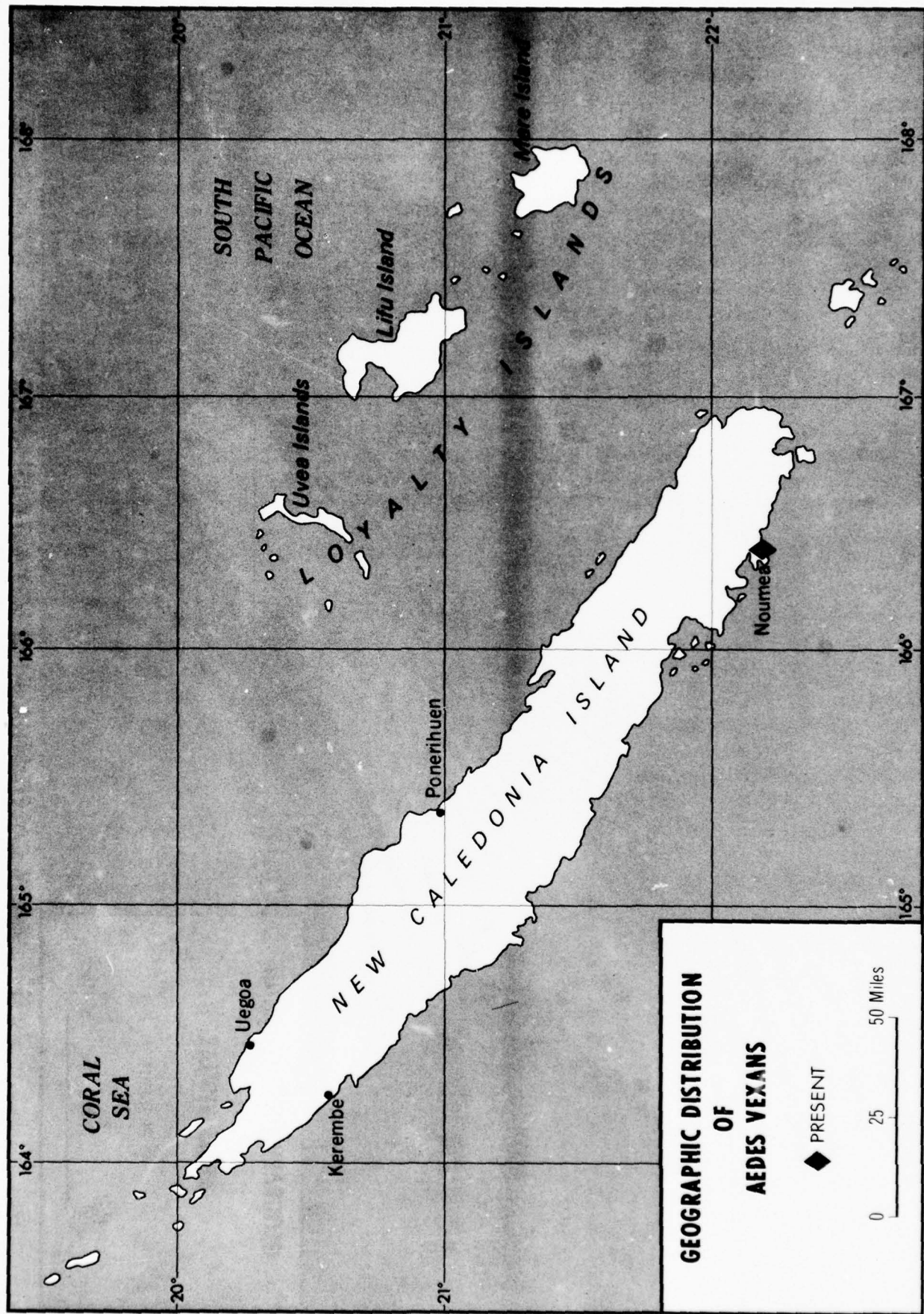
NEW CALEDONIA AND LOYALTY ISLANDS — MOSQUITO DATA

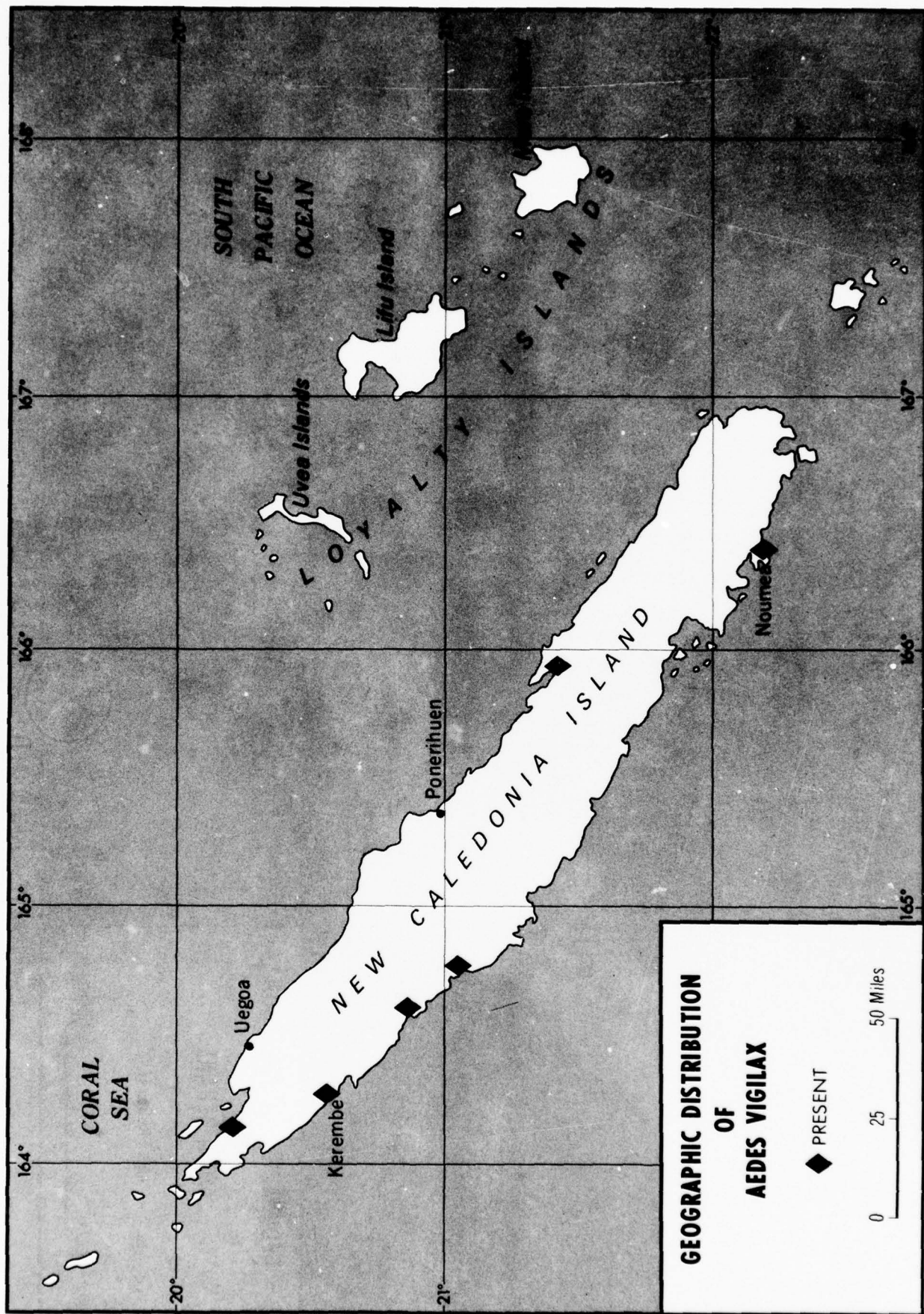
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex annulirostris</i>			fresh or stagnant water in pools, road ruts and artificial containers. (2025)		additional source: 2045.
<i>Culex basicinctus</i>			algal mats in fresh water streams and rivers. (2025)		
<i>Culex fatigans</i>	suspected vector. (2025)		fresh or foul or brackish water in artificial containers and in polluted pools, ponds and swamps. (2025)		additional sources: 2045, 2081.
<i>Culex pseudomelanoconia</i>			fresh water, shallow rocky streams. (2025)		
<i>Culex sitiens</i>			m angrove swamps, tide pools. (2025)		additional source: 2045
<i>Mansonia crassipes</i>			aquatic plants in fresh water swamps. (2025)		
<i>Taeniorhynchus xanthogaster</i>					source: 2045.
<i>Tripteroides caledonica</i>			tree holes, tin cans, coconut husks, pitcher plants. (2025)		

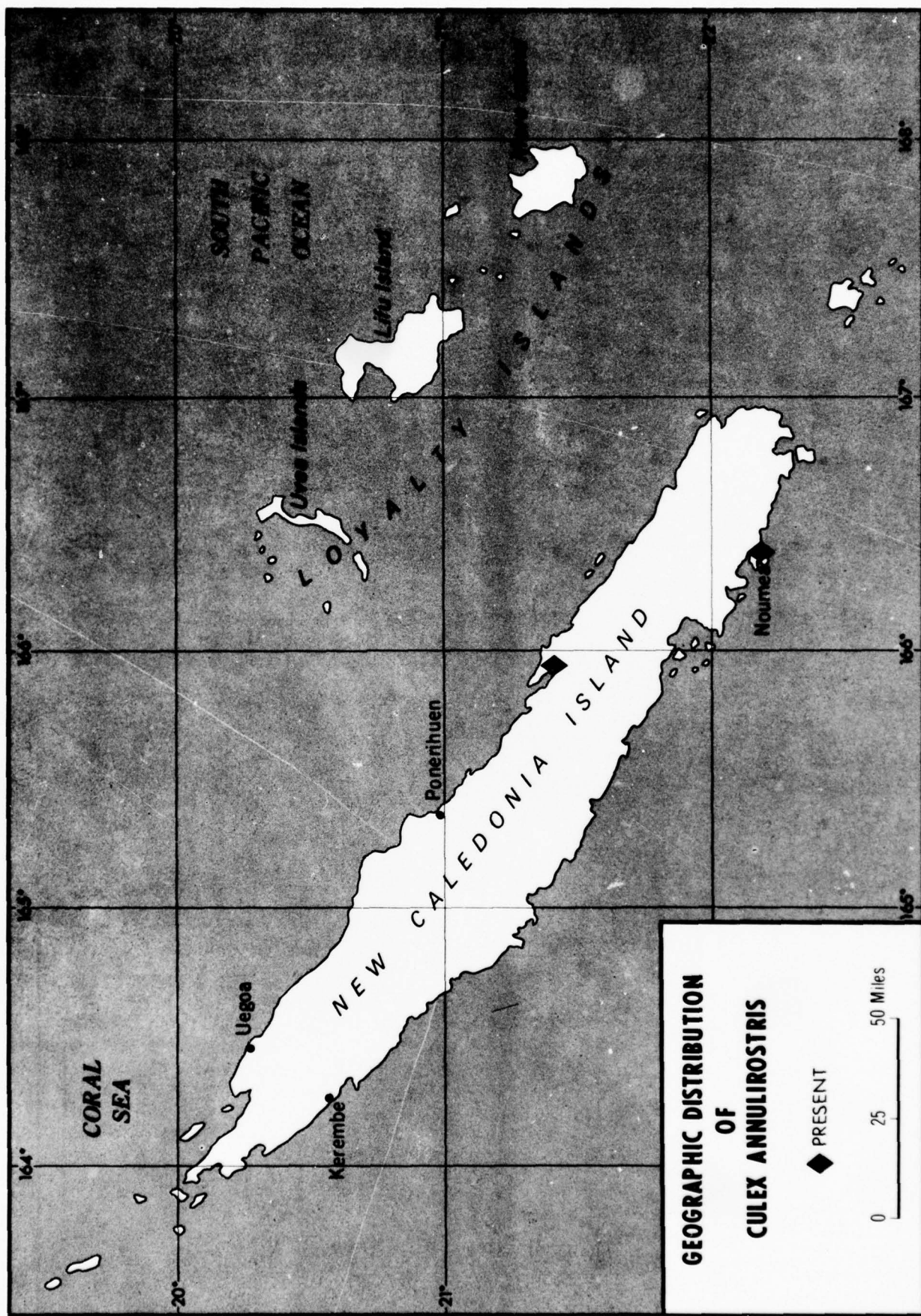


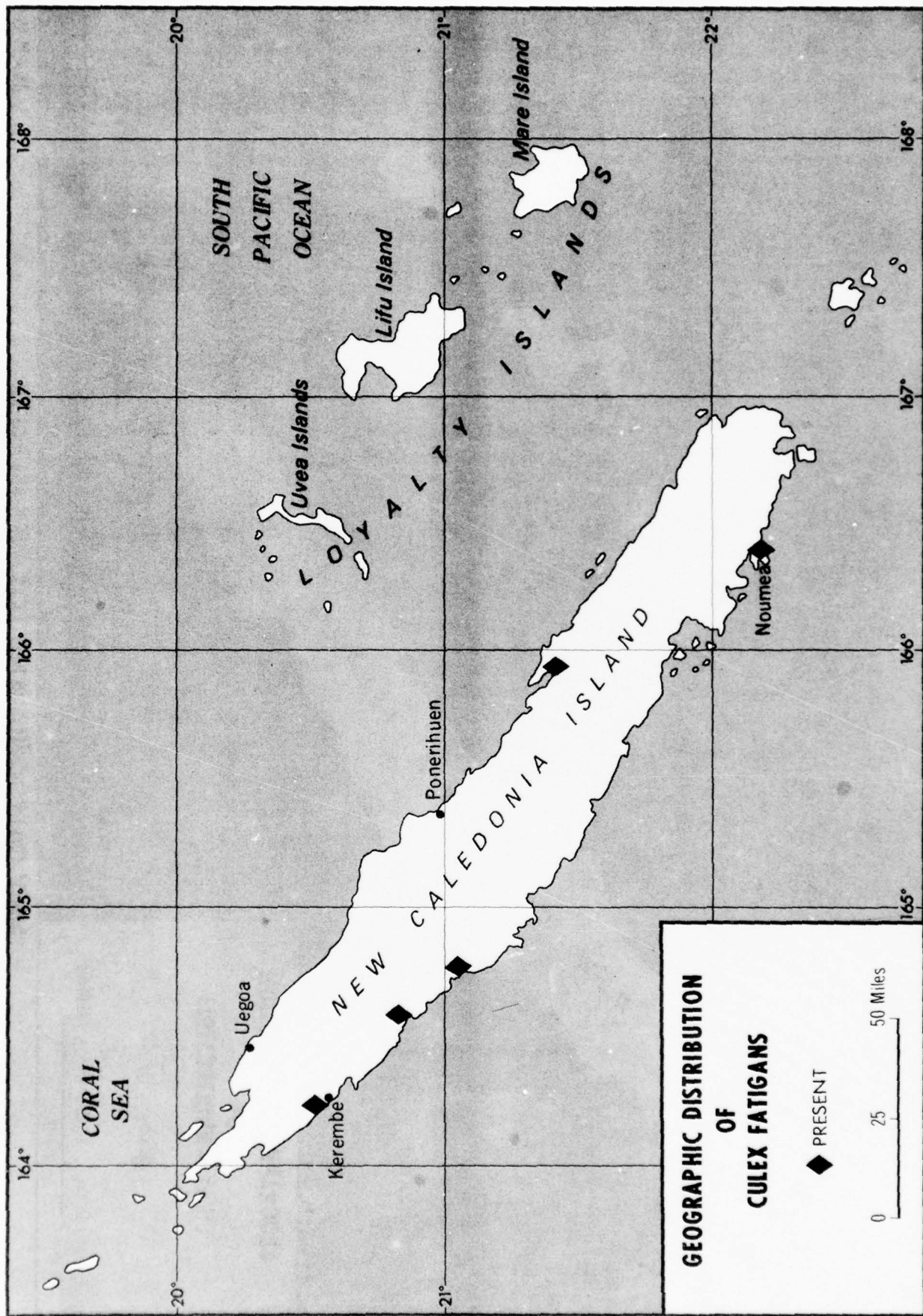


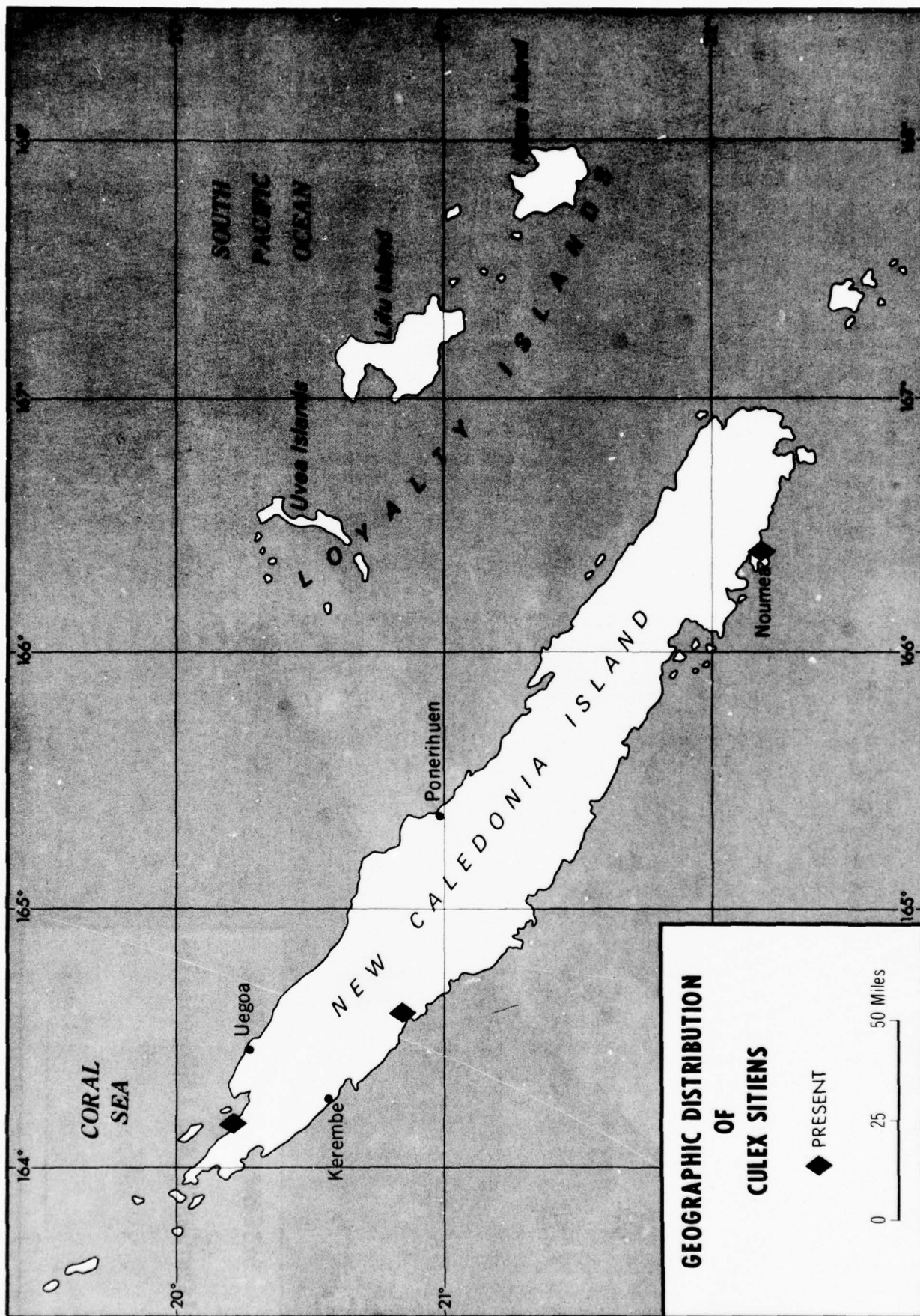


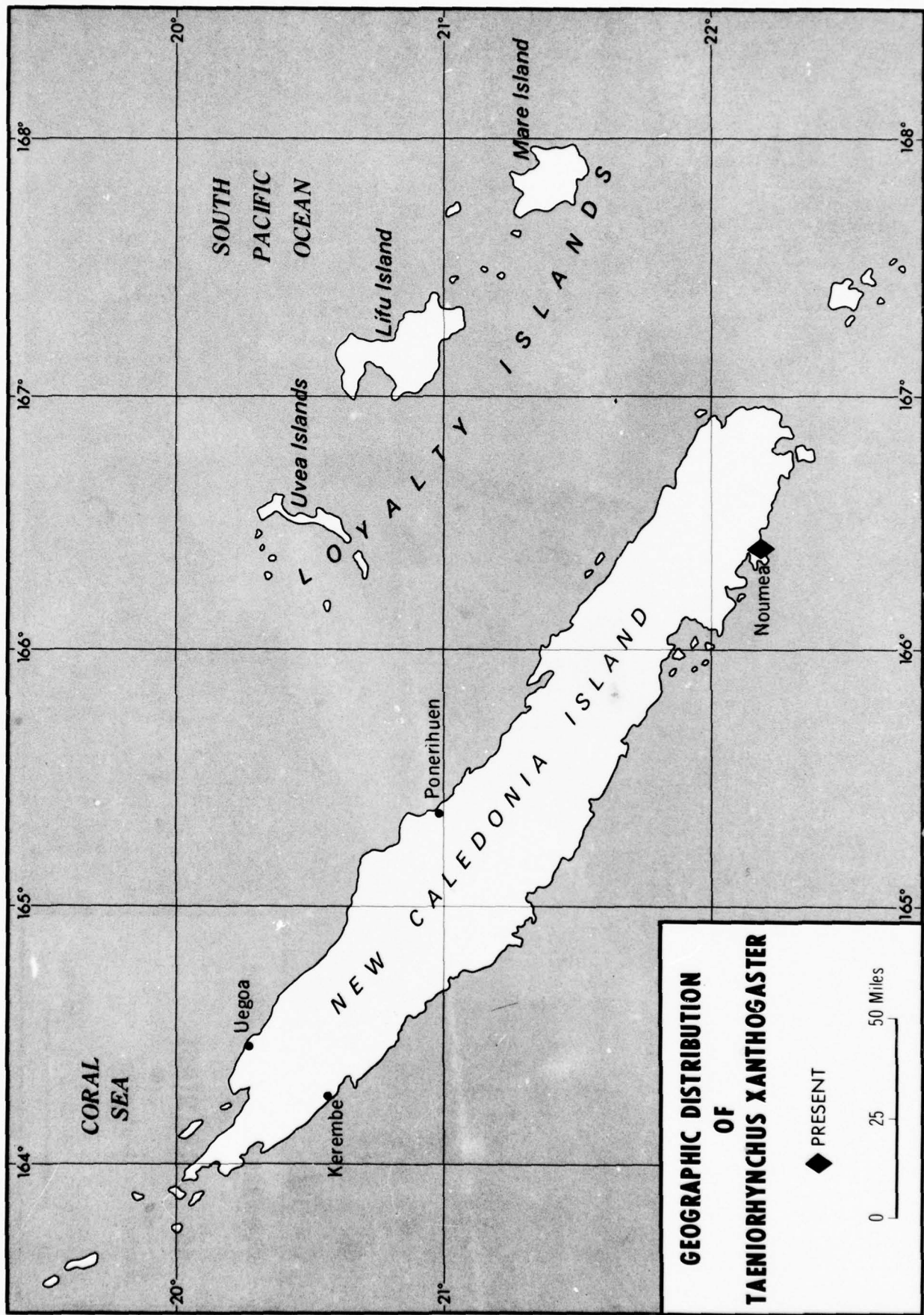












BIBLIOGRAPHY

NEW CALEDONIA AND LOYALTY ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2025	Perry, William J. 1950. Mosquitoes and mosquito borne disease on New Caledonia, an historic account: 1885-1946. American Journal of Tropical Medicine 30: 103-113.
2045	Lacour, M. and J. Rageau. 1975. Enquete epidemiologique et entomologique sur la filarirose de bancroft en Nouvelle Caledonie et dependances. South Pacific Commission Technical Paper. #110: 1-25.
2048	Backhouse, T. C. and A. R. Woodhill. 1956. Further studies on the hospitality of some Scutellaris group and other mosquitoes towards <u>Wuchereria bancrofti</u> . from New Caledonia. South Pacific Commission Technical Paper. #17: 1-4.

BIBLIOGRAPHY

NEW CALEDONIA AND LOYALTY ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2025	Perry, William J. 1950. Mosquitoes and mosquito borne disease on New Caledonia, an historic account: 1885-1946. American Journal of Tropical Medicine 30: 103-113.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2045	Lacour, M. and J. Rageau. 1957. Enquete epidemiologique et entomologique sur la filariose de bancroft en Nouvelle Caledonie et dependances. South Pacific Commission Technical Paper. #110: 1-25.
2048	Backhouse, T. C. and A. R. Woodhill. 1956. Further studies on the hospitality of some Scutellaris group and other mosquitoes towards <u>Wuchereria bancrofti</u> from New Caledonia. South Pacific Commission Technical Paper. #17: 1-4.
2081	Iyengar, M. O. T. and M. A. U. Menon. 1956. Studies on filariasis in New Caledonia. South Pacific Commission Technical Paper. #15: 1-3.
2104	Iyengar, M. O. T. 1955. Filariasis investigations in New Caledonia. South Pacific Commission Quarterly Bulletin. 27 and 34.

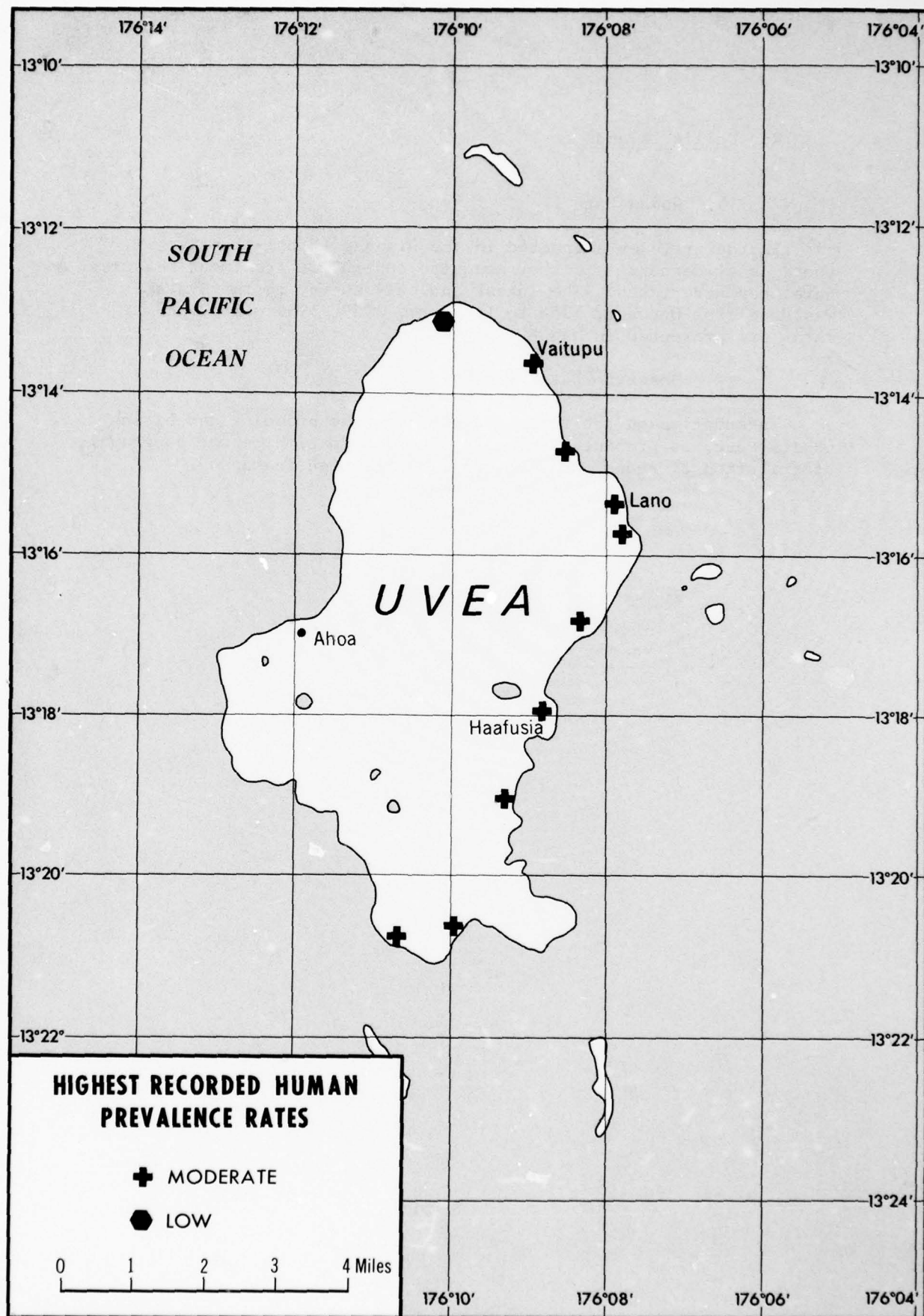
K. Wallis Islands

1. Human Data

In the articles extracted in the Disease Information System, there is evidence that either mosquito control or treatment measures have been undertaken. The latest and only survey in the System was done from October, 1958 to February, 1959. The prevalence rates are presented in Map 68.

2. Mosquito Data

Information on the role, the habitat, the breeding and biting habits, etc. is presented in Table 18. Information on the geographic distribution of Aedes polynesiensis is presented in Map 69.



WALLIS ISLANDS

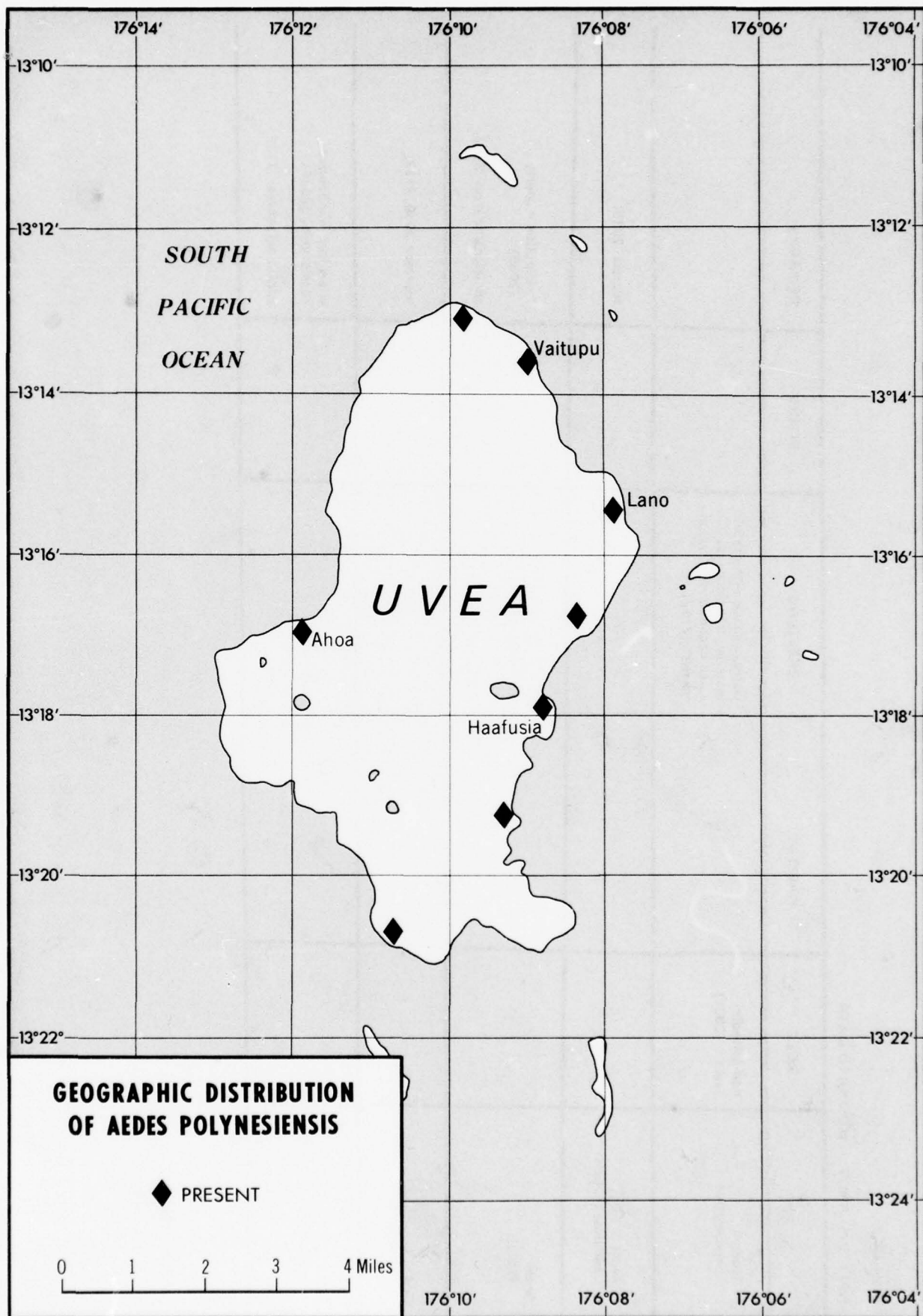
MAP 68

Table 18

WALLIS ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	non-periodic vector. (2036)		water in shade with organic material, tree holes, rat eaten coconuts, rain water barrels. (2112)		
* <i>Aedes pseudoscutellaris</i>					source: 2030.
<i>Aedes aegypti</i>			only occasionally extensive. (2030)		distribution = spotty (2030) additional source: 2122.
<i>Culex annulirostris</i>					sources: 2030, 2122.
<i>Culex fatigans</i>					a few foci in inhabited coastal area. (2030) additional source: 2122.

* Major Vector



WALLIS ISLANDS

MAP 69

BIBLIOGRAPHY

WALLIS ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2122	Rageau, Jean. 1959. Enquete sur la filariose a Wallis. Institut Francais d'Oceanie. 1-37.

BIBLIOGRAPHY

WALLIS ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2036	Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.
2122	Rageau, Jean. 1959. Enquete sur la filariose a Wallis. Institut Francais d'Oceanie. 1-37.

L. TOKELAU ISLANDS

1. Human Data

A June 15, 1953 survey on Mukunono Island noted a prevalence rate of 17.5% for 5 to 78 year old natives who had lived on the island most of their lives. The only other survey, taken in 1920 to 1921, noted prevalence rates in the moderate (10.0 to 49.9%) range (Map 70).

2. Mosquito Data

Limited information on the two mosquitoes present can be found in Table 19. Information on the geographic distribution of Aedes polynesiensis and Aedes scutellaris is presented in Maps 71 and 72.

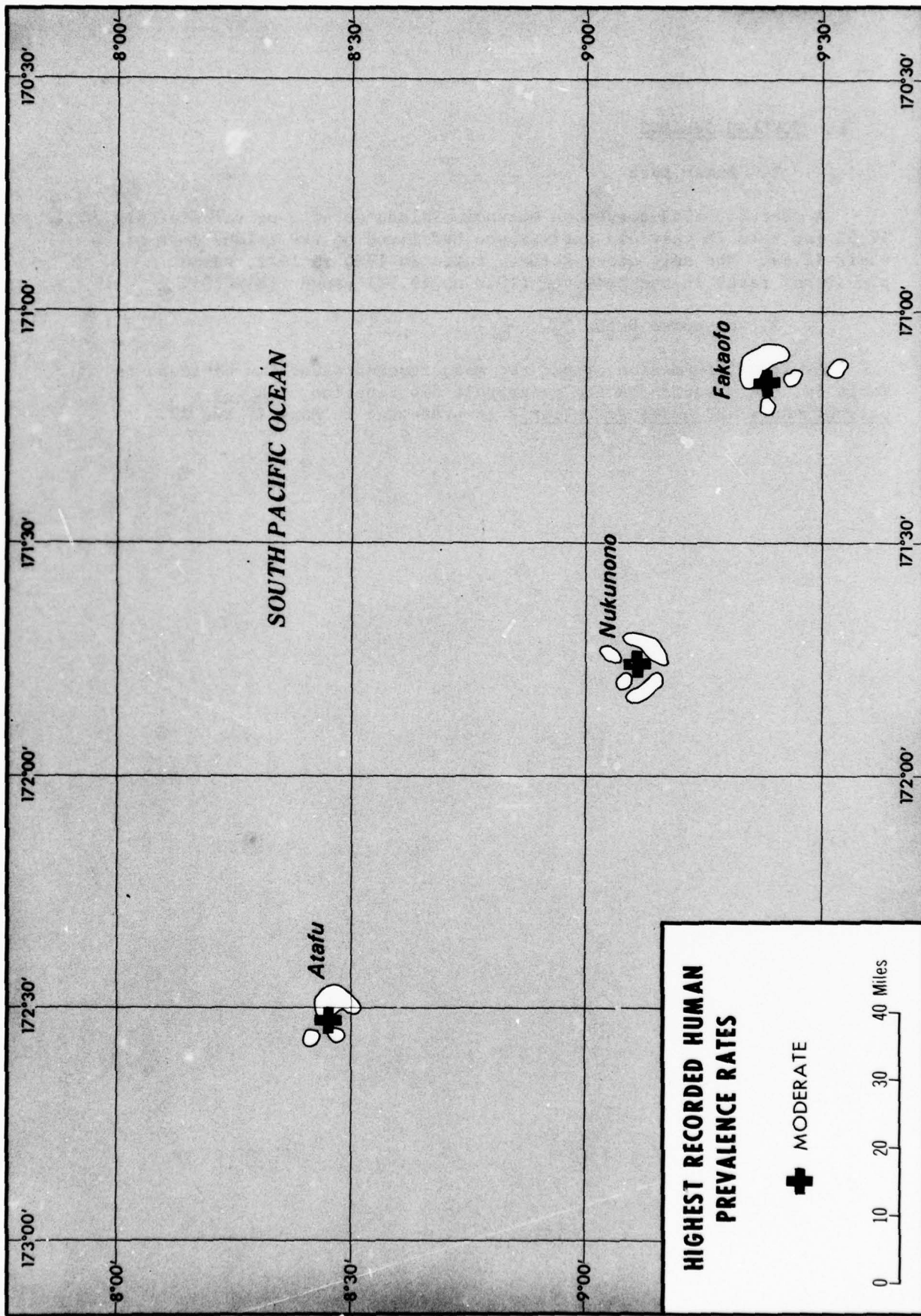
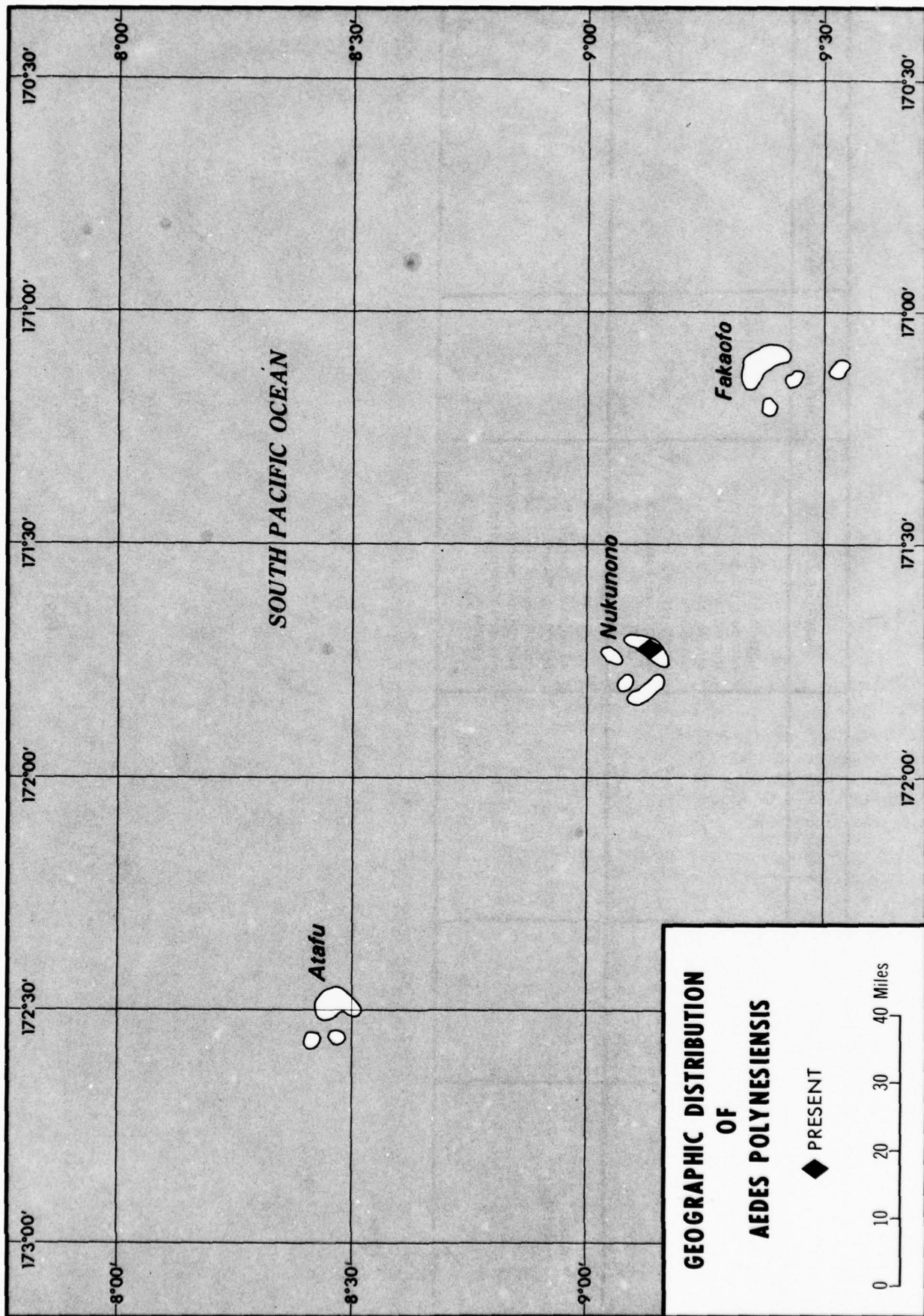


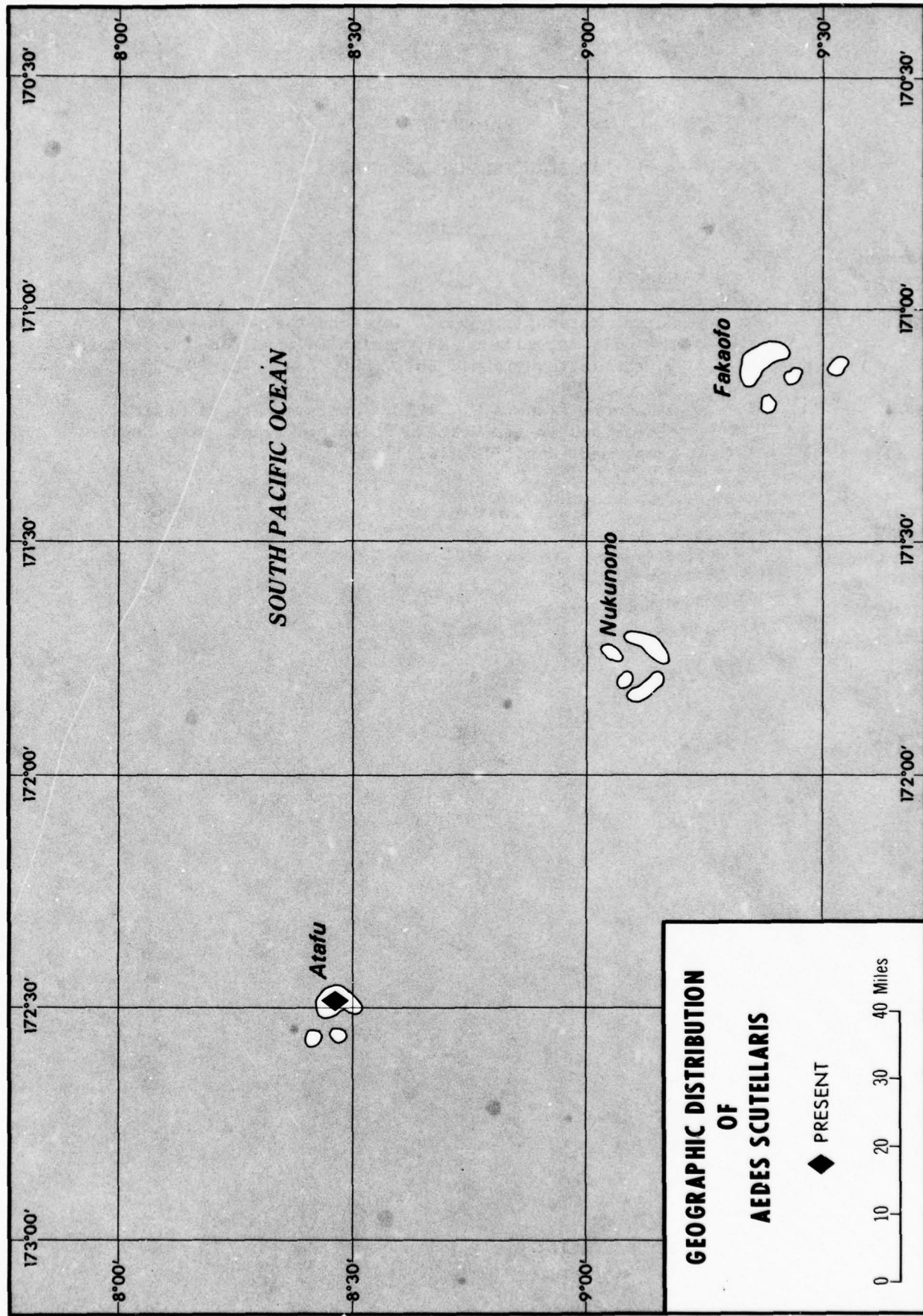
Table 19

TOKELAU ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes polynesiensis</i>	non-periodic vector. (2036)		water catchment hollows in coconuts, tree trunks, puka tree rot holes and beached canoes. all sites shaded. water temperature = 26.3 to 27°C. pH = 6.0 to 7.6, puka tree rot holes = 6.8. (2080)		
* <i>Aedes scutellaris</i>			44 gallon rain barrels at pH 7.0 and 6.4 and temperature of 28°C. barrels had ill-fitting wooden covers and were close to the house. (2080)		

* Major Vector





BIBLIOGRAPHY

TOKELAU ISLANDS AND HUMAN

Document
Number

Source

2080

Laird, Marshall. 1955. Notes on the mosquitos of the Gilbert, Ellice and Tokelau Islands, and on filariasis in the latter group. Bull. Ent. Res. 46: 291-309.

2095

O'Connor, Francis W. 1922. Some results of medical researches in the Western Pacific. Trans. Roy. Soc. Trop. Med. Hyg. 16 (1&2): 28-56.

BIBLIOGRAPHY

TOKELAU ISLANDS AND MOSQUITO

Document
Number

Source

2080

Laird, Marshall. 1955. Notes on the mosquitos of the Gilbert, Ellice and Tokelau Islands, and on filarias in the latter group. Bull. Ent. Res. 46: 291-300.

M. Niue Island

1. Human Data

Sub-periodic bancroftian filariasis has been endemic in Niue Island. A 1954 survey revealed a MF rate of 22.1%. A MDA program was initiated in 1956 and by 1957 the MF rate (by standard blood film examination) had diminished to 3%. By 1972, the MF rate, as determined by a WHO team, had risen to 16.3% and a new MDA campaign was undertaken.

2. Mosquito Data

The main vector is reputed to be Aedes cooki (Table 20).

Table 20

NIUE ISLAND -- MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Aedes cooki</i>	suspected vector. (2053)		rain water containers, coconut shells, tins. (2053)		
* <i>Aedes scutellaris</i>		village and bush. (2053)	domestic containers for rain water storage, tin cans, coconut shells, no rat damaged coconuts. (2053)		
* <i>Aedes tongae-niue</i>	assumed vector. (2053)	outdoor resting. (2053)			
<i>Culex sitiens</i>			small rock pools of brackish or saline water. breeding places restricted to cliffs overhanging the sea coast. (2053)		population comparatively rare. (2053)

* Major Vector

BIBLIOGRAPHY

NIUE ISLAND AND HUMAN

<u>Document Number</u>	<u>Source</u>
2038	Kessel, John F. and Emile Massal. 1962. Control of bancroftian filariasis in the Pacific. Bull. Wld. Hlth. Org. 27: 543-554.
2053	Iyengar, M. O. T. 1958. Investigation on filariasis in Niue. South Pacific Commission Technical Paper. #30: 1-10.
2110	Simpson, E. J. B. 1957. Mass therapy in filariasis. Note on control in Niue Island. N. Z. Med. Jour. 56: 136-137.
2125	Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.

BIBLIOGRAPHY

NIUE ISLAND AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68 1-44
2053	Iyengar, M. O. T. 1958. Investigation of filariasis in Niue. South Pacific Commission Technical Paper. #30: 1-10.
2125	Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6.

N. New Hebrides

1. Human Data

The most extensive surveys were done in 1943 and 1944. The most recent survey was done in 1966 and 1967 on Santa Marie, Banks Islands and Torres Islands. Geographic distribution of the human prevalence rates can be found in Map 73. Prevalence rates vary; in the Maskelynes, the rate was 3%, while in the Southwest Bay Area it was 65%.

2. Mosquito Data

Information on the role and the bionomics can be found in Table 21. The W. bancrofti is periodic and transmitted mainly by Anopheles farauti. The geographic distribution of Anopheles farauti is presented in Map 74. The role of Culex fatigans as a vector in the New Hebrides is not known.

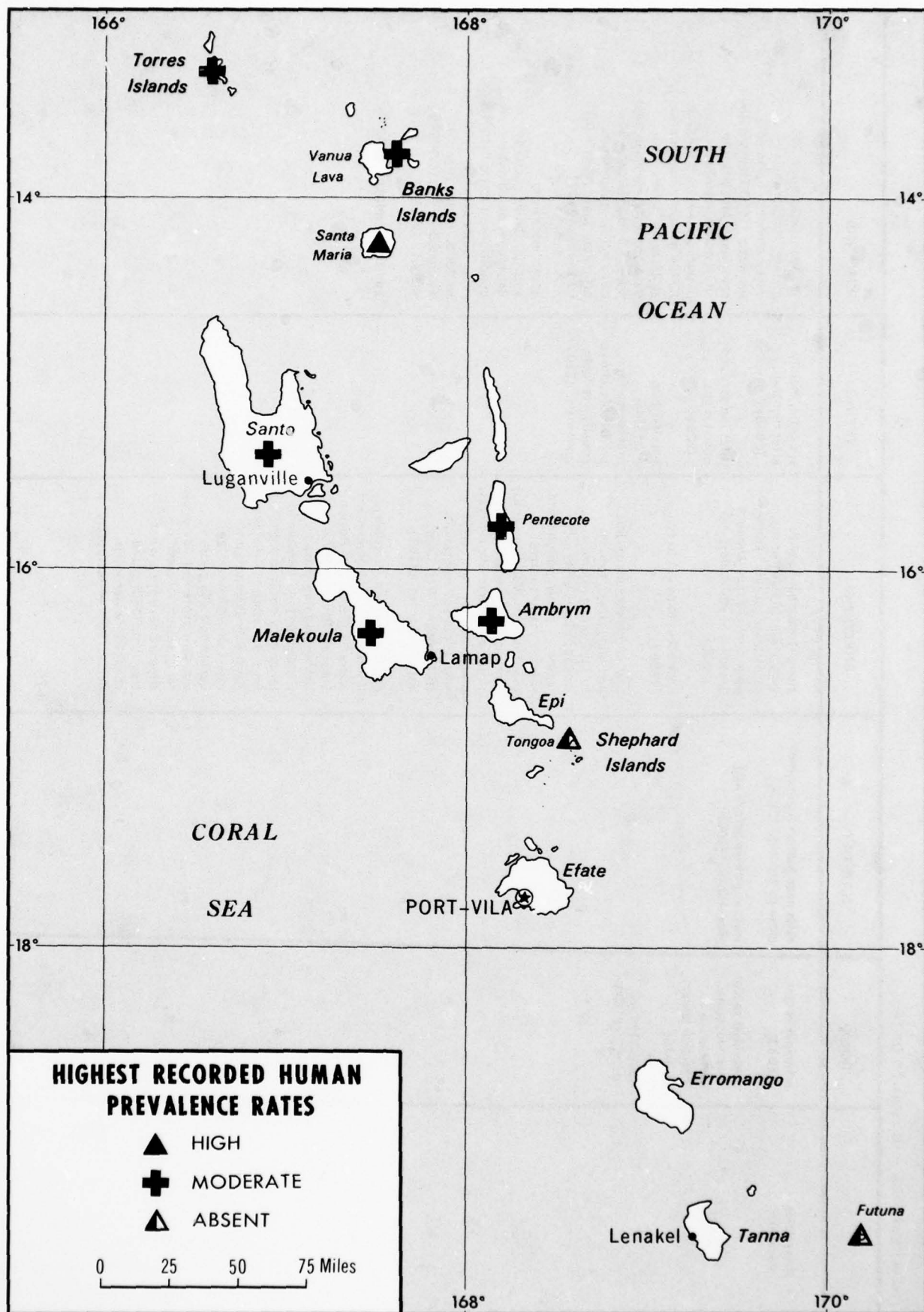


Table 21

NEW HEBRIDES — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Anopheles farauti</i>	principal vector. (2083) presumed vector. only mosquito harbouring infective larvae. (2030) implicated as vector. (2107)	rests near human habitation close to ground. (2030) rests in houses before and after biting. (2083)	along stream banks with vegetation, in hoof prints, ditches, wheel ruts. some open sunlight may enhance breeding in still water. (2030) near edges exposed to sun. (2083) few permanent places but including rivers, streams, springs, taro gardens, seepage pits. during rainy season -- pools, puddles and ruts are major sources. (Southeastern Espirito Santo) numerous permanent places in streams and brackish lagoons. preference for sunlit areas with abundant vegetation. (Big Bay and West Coast Espirito Santo) (2107) early dry season (October) -- limited to area of permanent water -- Turtle Bay Region, Sarakata River Valley. beginning rainy season (November) -- breeding in temporary pools and drainage pits. dry season -- Sarakata River acts as important reservoir with breeding occurring along grassy margins, protected side pools. rainy season -- breeding sites are destroyed when frequent flooding and change in water levels occur. 90% of temporary	sporadic, mainly after nightfall. (2030) bites indoors and out at night. (2083) painless bite. nocturnal. preference for human blood over equally available mammals. (2107)	abundant at altitude 335 meters. full larval development in up to 65% sea water (13000 parts/million chlorides). late larval to adult development successful in pure sea water (20000 to 23000 parts/million chlorides). at 28 to 30°C length of developmental stages in days -- egg = 1.5 to 2, larvae = 10, pupa = 1.5. quiet flight. estimated flight range = 0.75 to 1 mile. (2107) adults essentially anthropophilic. activity dependent on climatic conditions. most quiet after rain. quiet evenings 1700 to 2000. flight range estimated at 700 to 900 meters. (2109) additional source: 2042.

Table 21 cont.

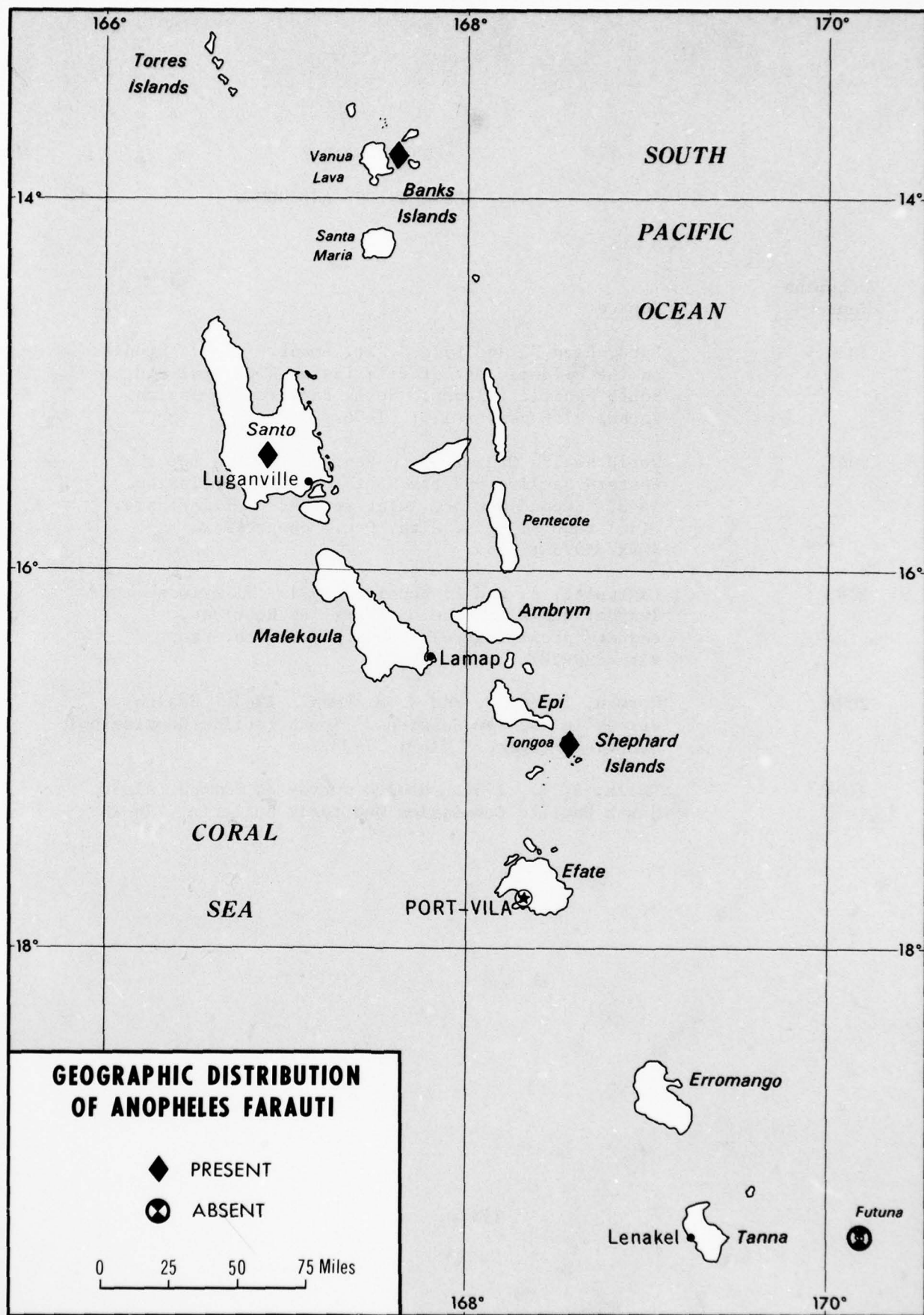
NEW HEBRIDES — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* Anopheles farauti (cont.)			breeding sites made by troops. (2107) highest larval counts from sunlit streams and river margins with protective emergent vegetation. (2109)		
Aedes futunae	suspected vector. (2042)				
Aedes aegypti					source: 2030.
Aedes funereus					source: 2030.
Aedes hebrideus					source: 2030.
Aedes vexans					source: 2030.
Culex annulirostris					source: 2030.
* Major Vector					

Table 21 cont.

NEW HEBRIDES — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
Culex fatigans					rare. (2030) additional source: 2042.
Culex pacificus					source: 2030.
Culex sitiens					source: 2030.



BIBLIOGRAPHY

NEW HEBRIDES AND HUMAN

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1963. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2083	Lagraulet, J. and P. Bonnin. 1971. Filariose lymphatique a Mallicolo (Nouvelles Hebrides, enquete preliminaire). Bull. Soc. Path. Exot. #2: 229-231.
2098	Norman, Taylor W. and W. H. Rees. 1964. Health survey in the New Hebrides. South Pacific Commission Technical Paper. #143: 1-38.
2106	Mills, A. R. 1954. Health survey of Futuna Island. South Pacific Commission Quarterly Bulletin. 26-28.

BIBLIOGRAPHY

NEW HEBRIDES AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/68: 1-44.
2083	Lagraulet, J. and P. Bonnin. 1971. Filariose lymphatique a Mallicolo (Nouvelles Hebrides, enquete preliminaire). Bull. Soc. Path. Exot. #2: 229-231.
2106	Mills, A. R. 1954. Health survey of Futuna Island. South Pacific Commission Quarterly Bulletin. 26-28.
2109	Perry, William J. 1950. Principal larval and adult habitats of <u>Anopheles farauti</u> lav. in the British Solomon Islands. Mosquito News. 10 (3): 117-126.

0. Solomon Islands

1. Human Data

Treatment measures were started sometime during the 1960's. Mosquito control measures under the malaria eradication program started in 1960 and were extended to all islands in 1972. The geographic distribution of the highest prevalence rates for periodic bancroftian filariasis is presented in Map 75. The most recent prevalence rates can be found in Table 22.

Vector control for malaria initiated in various parts of the Solomon Islands between 1960 and 1968 is believed to have reduced the prevalence of filariasis. (Anopheles farauti, A. punctulatus and A. koliensis transmit both malaria and W. bancrofti.) A 1970 to 1971 blood survey indicated that areas where the control measures had been operative for only 2 to 3 years, such as Choiseul and Guadalcanal, MF rates were still high, 19% and 25% respectively. The MF rate in Guadalcanal was 25% before spraying operations and 19% 3 years after spraying.

2. Mosquito Data

Information on the role and the bionomics can be found in Table 23. The geographic distribution of the various mosquito species is presented in Maps 76 and 92.

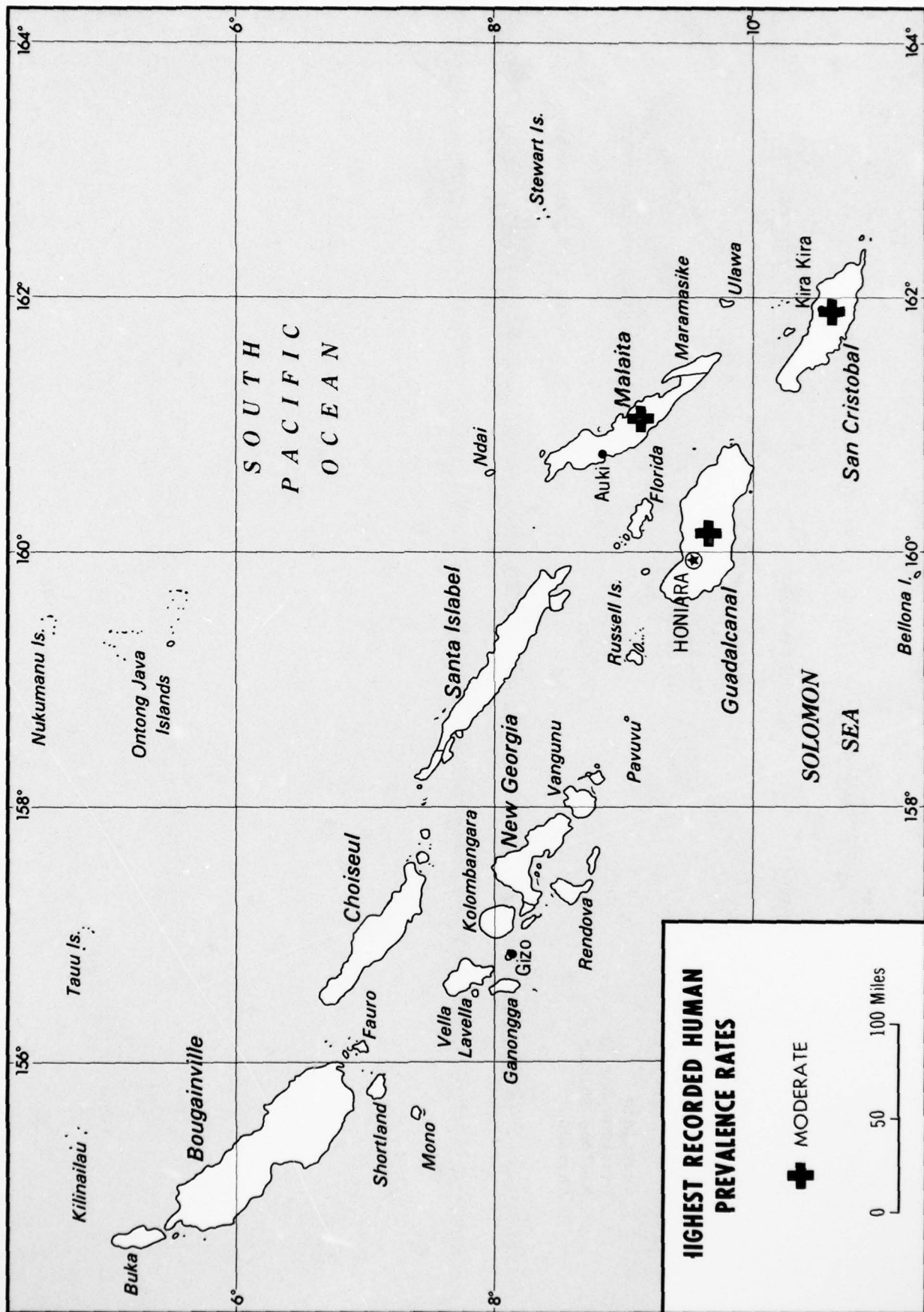


Table 22 SOLOMON ISLANDS - Most Recent Prevalence Rates (2147)

<u>LOCATION</u>	<u>DATE</u>	<u>PREVALENCE</u>	<u>TREATMENT INFORMATION</u>
Solomon Islands	1974	varies from 0 to 80%. est. 16.1% of total population affected	
Shortland	1972	0.3%	10 years post treatment
Gracious Bay Area	1973	2.7	
Bellona Island	1973	Absent	
Choiseul	1974	5.2	4 years post treatment

Table 23

SOLOMON ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Anopheles farauti</i>	assumed vector based on epidemiology, previous studies, highest prevalence of developing larvae. (2058) infection up to 50% with <u>W. bancrofti</u> on Guadalcanal. (2109)		limited to perimeter of Soala Lake and exposed margins of Soala stream. (2058) highest larval counts from sunlit streams and river margins with protective emergent vegetation. (2109) numerous long winding sluggish streams with marginal vegetation. lagoons and swamps at stream outlets. ponds formed by flood water diversion of draining stream path. ruts in compact top soil from vehicles. (Guadalcanal) limestone pockets along stream beds especially during dry periods. bomb and shell craters of temporary importance. (Florida Islands) numerous small streams. during drier periods potholes in limestone water courses were major source. (Russell Islands) extensive swamp areas surrounding Munda Point. spread to bomb craters and shell holes. (New Georgia Group) along margins of large streams. flat coastal stream mouths. vehicle depressions and manholes. (Bougainville) (2109)		adults essentially anthropophilic. activity dependent on climatic conditions. most active after rains, quiet evenings, 1700 to 2000, flight range = estimated 700 to 900 meters. (2109)
* Major Vector			179		

Table 23 cont.

SOLOMON ISLANDS -- MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
* <i>Anopheles koliensis</i>	important localized vector. (2109)				additional source: 2030.
* <i>Anopheles punctulatus</i>	may be responsible for universal endemicity rather than hyperendemicity for which <i>Aedes kochi</i> may be responsible. (2103)				additional source: 2030.
<i>Aedes albipennis</i>			tree holes, coral pools with organic matter. (2058)		
<i>Aedes albolineatus</i>			tree holes, coconut shells, tin cans, coral pockets. (2058)		
<i>Aedes imprimens</i>					source: 2030.
<i>Aedes kochi</i>	coincides with hyperendemic foci and may be responsible. (2103)				
* Major Vector			180		

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HAWAII UNIV HONOLULU DEPT OF TROPICAL MEDICINE AND M--ETC F/G 6/5
A BIOMETRIC STUDY OF FILARIASIS 'WUCHERERIA BANCROFTI' IN THE S--ETC(U)
JUN 76 R S DESOWITZ DADA17-74-C-4042

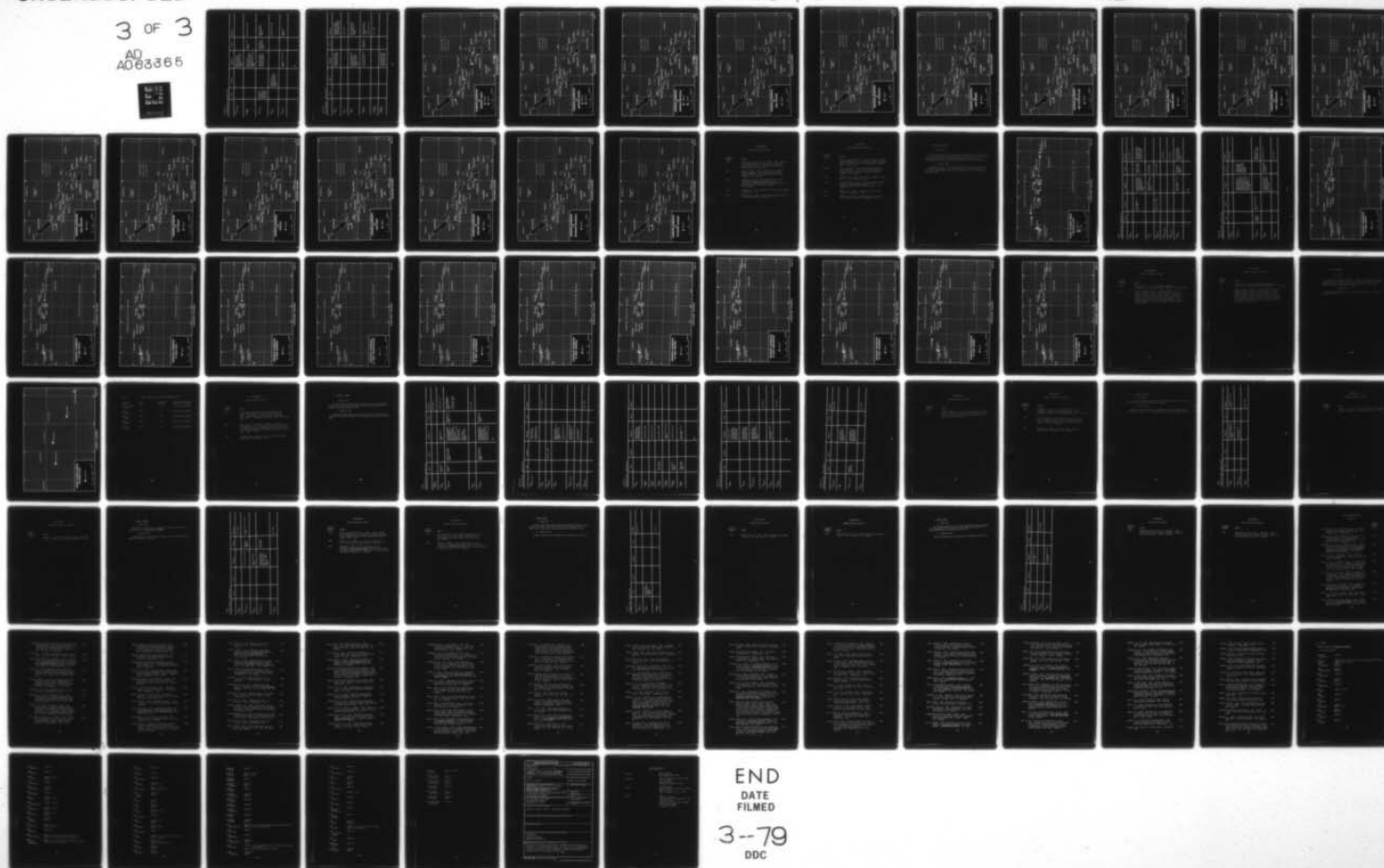
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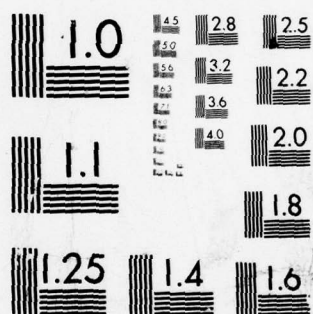
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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Table 23 cont.

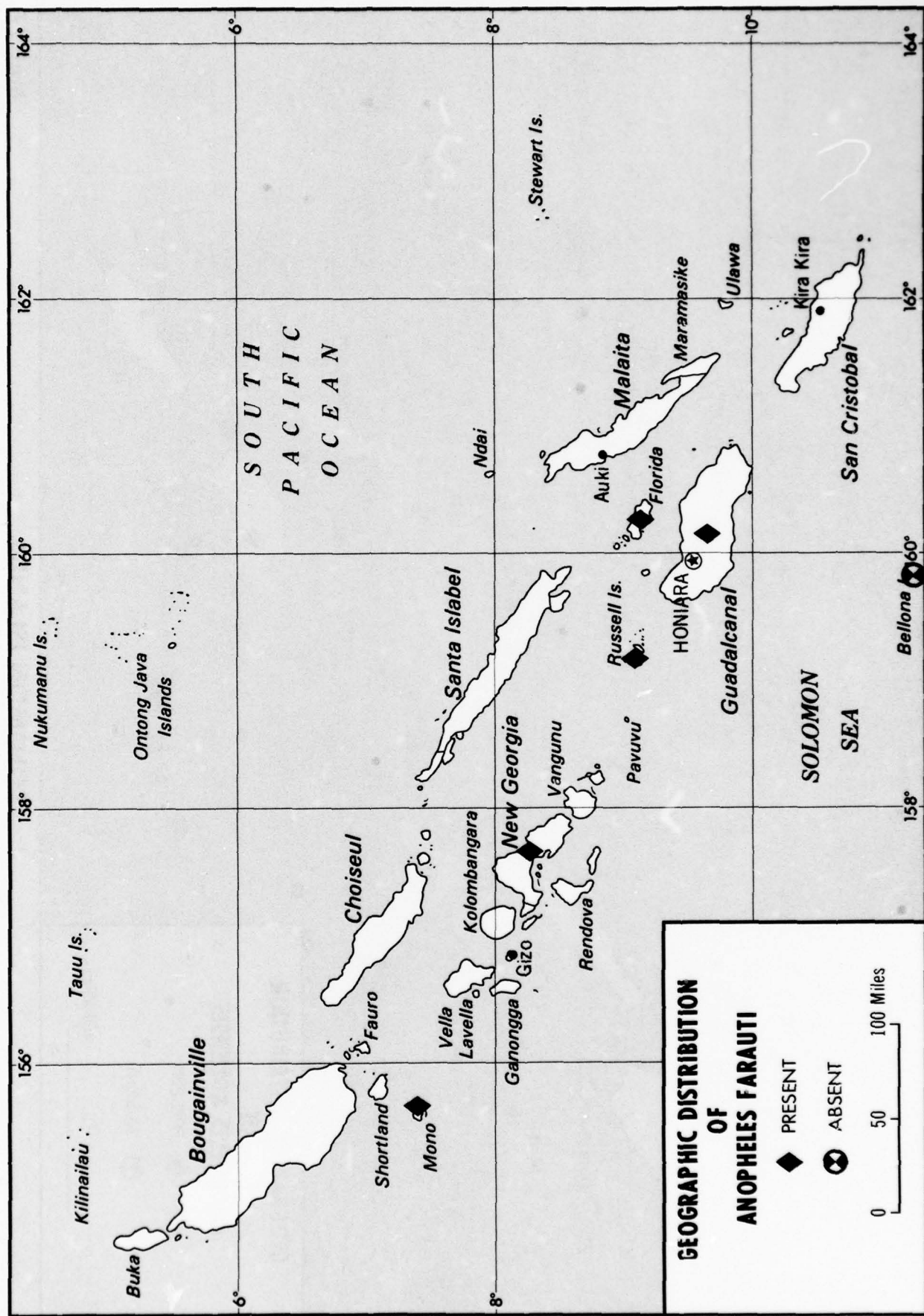
SOLOMON ISLANDS — MOSQUITO DATA

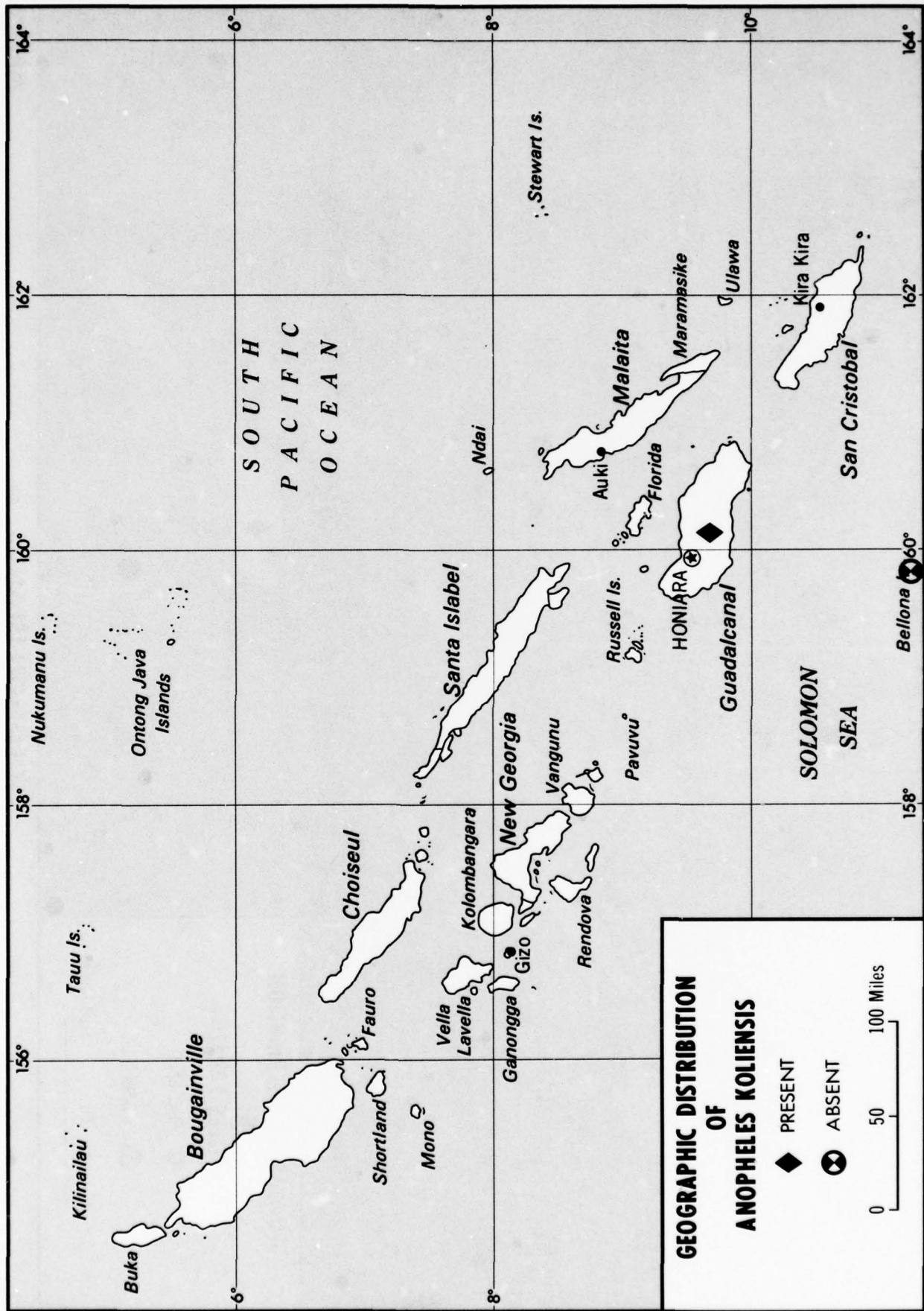
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes quasiscutellaris</i>			all types of artificial containers, tree holes, coral pockets with water and high organic content. (2058)		
<i>Armigeres breinli</i>			stagnant water of putrefying coconut husks. hollow trunks of bamboo and sago palm. semi-mangrove scrub along coast. (2058)	vicious day biter. (2058)	additional source: 2030.
<i>Culex annulirostris</i>	experimental infection successful but no infective stage larvae after 15 days. (2058)		ground pools, road ruts, hoof prints, hog wallow containing fresh, brackish or foul water. (2058)	persistent biter in early evening and morning hours. (2058)	widely distributed throughout the islands. (2058)
<i>Culex fatigans</i>		has ability to take advantage of changing conditions and to develop DDT resistant strains. (2147)			additional source: 2030.
<i>Culex fraudatrix</i>			potholes with fresh water. (2058)		population rare. (2058)
			181		

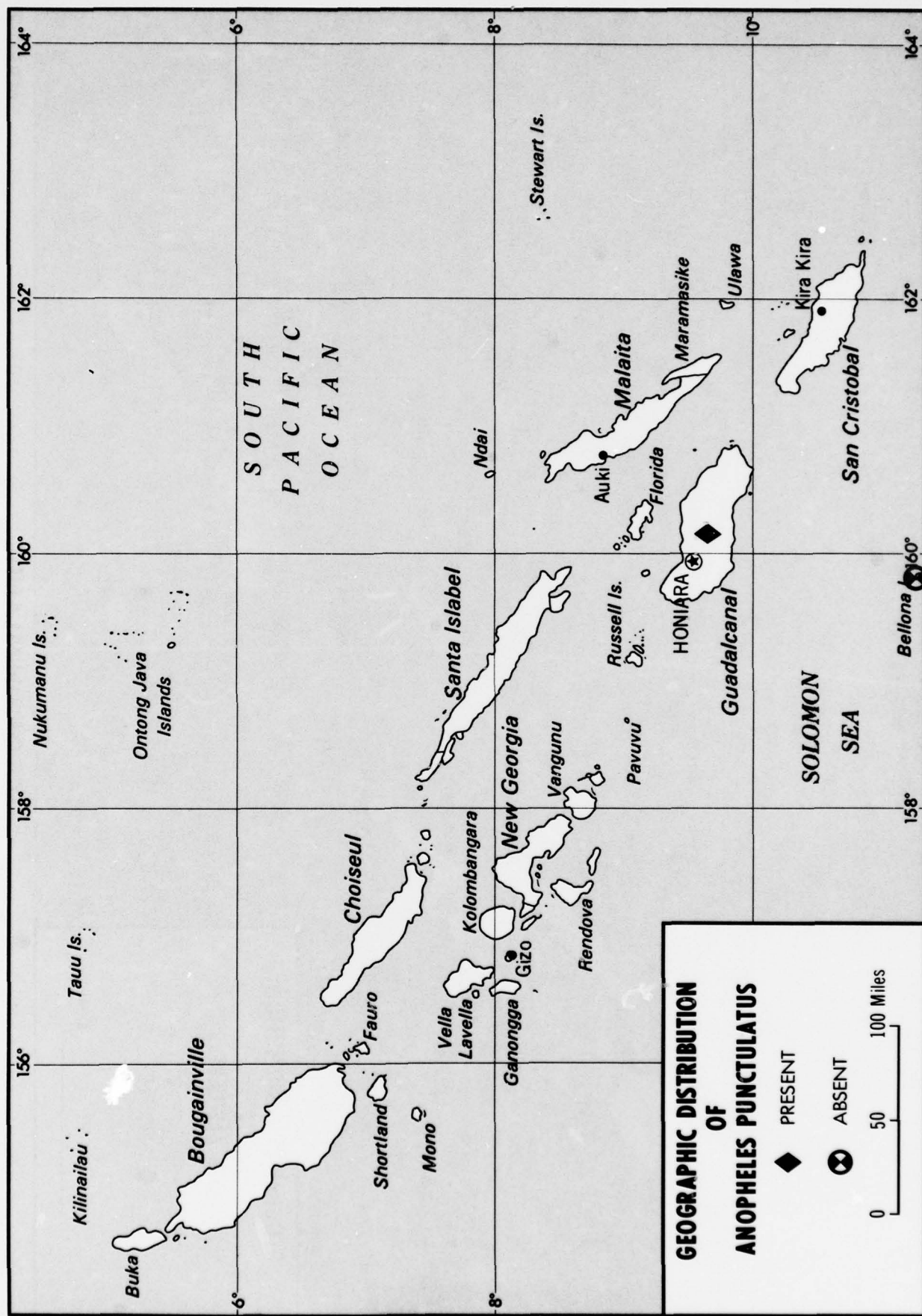
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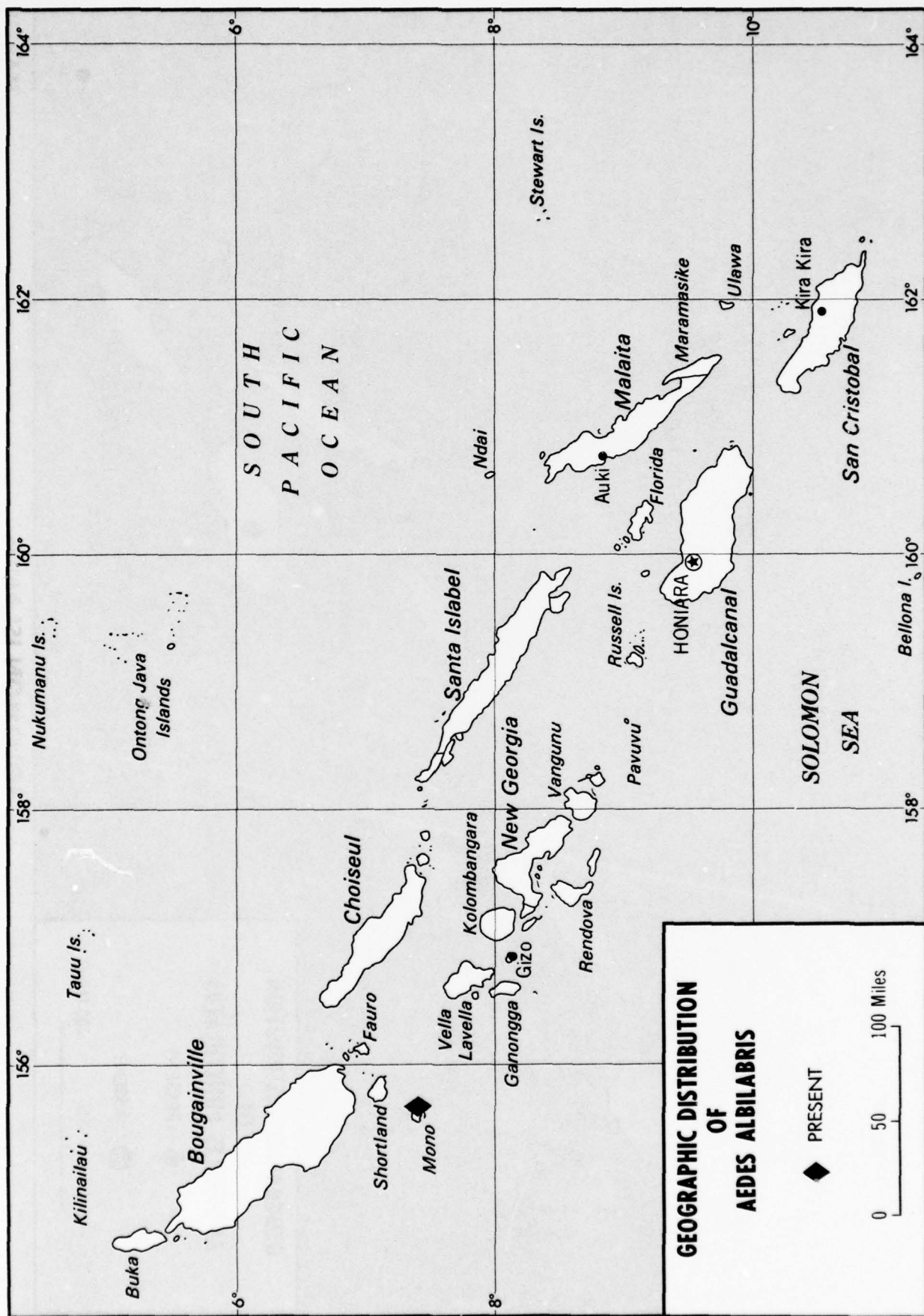
SOLOMON ISLANDS — MOSQUITO DATA

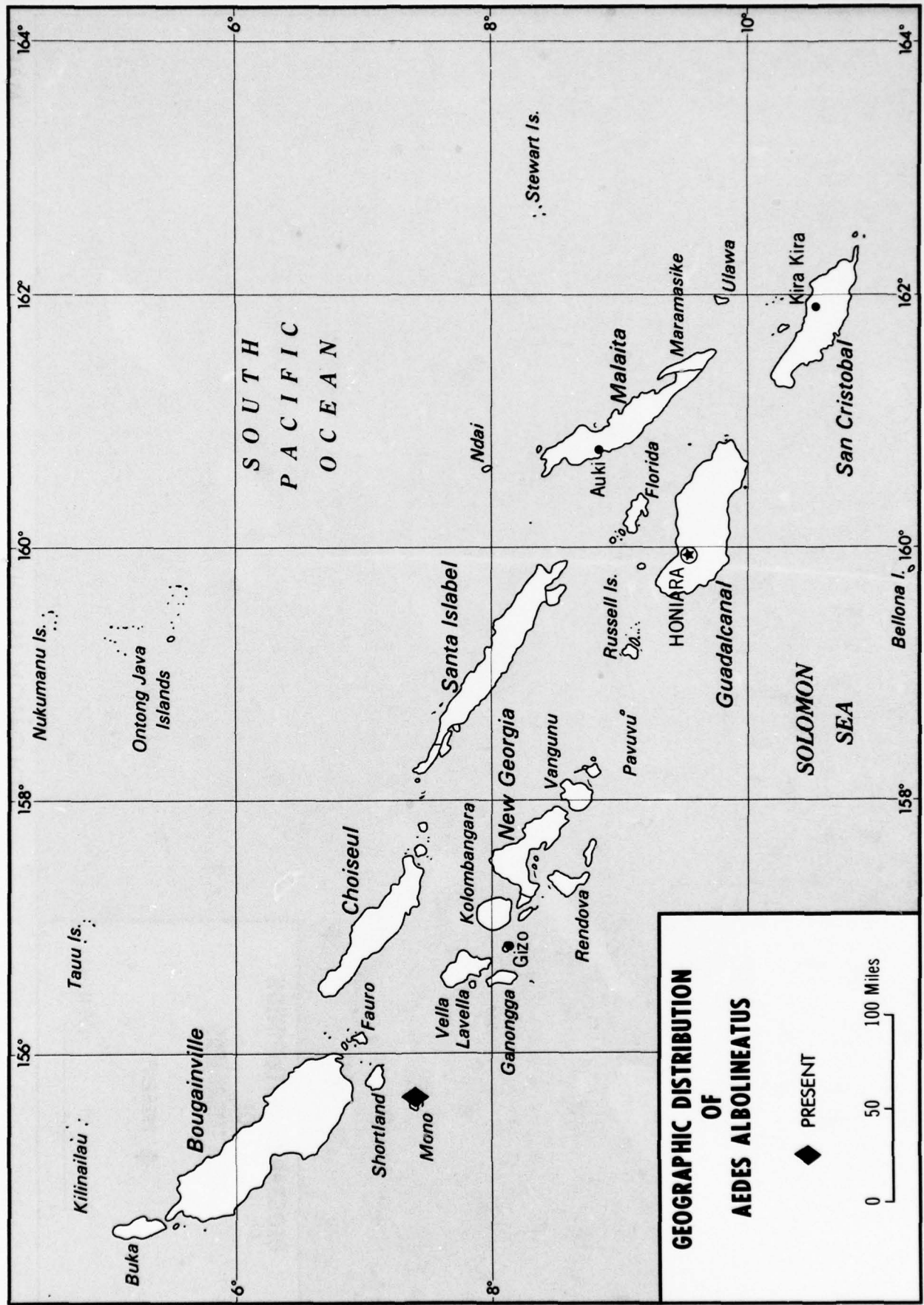
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex halifaxi</i>			artificial containers and rock pools on coral cliffs of Stirling Island. (2058)		mouth brushes adapted for grasping. larvae are predatory on aquatic forms of other species. (2058)
<i>Culex hilli</i>					source: 2030.
<i>Culex sitiens</i>			numerous coral pockets in high cliffs of Stirling Island south coast. brackish and salt water. rarely found inland. (2058)		larvae to adult = app. 16 days. develops best in sea water 25% or over. (2058)
<i>Mansonia uniformis</i>			com monly breeds in fresh water swamps. (2147)	prefers to bite outdoors. (2147)	probably rarely comes in contact with spraying. (2147) additional source: 2030.
<i>Tripteriodes quasiornata</i>					source: 2030.
<i>Tripteroides solomonis</i>			coconut shells, occasional coral pockets with high concentration dissolved organic tannins. (2058)		

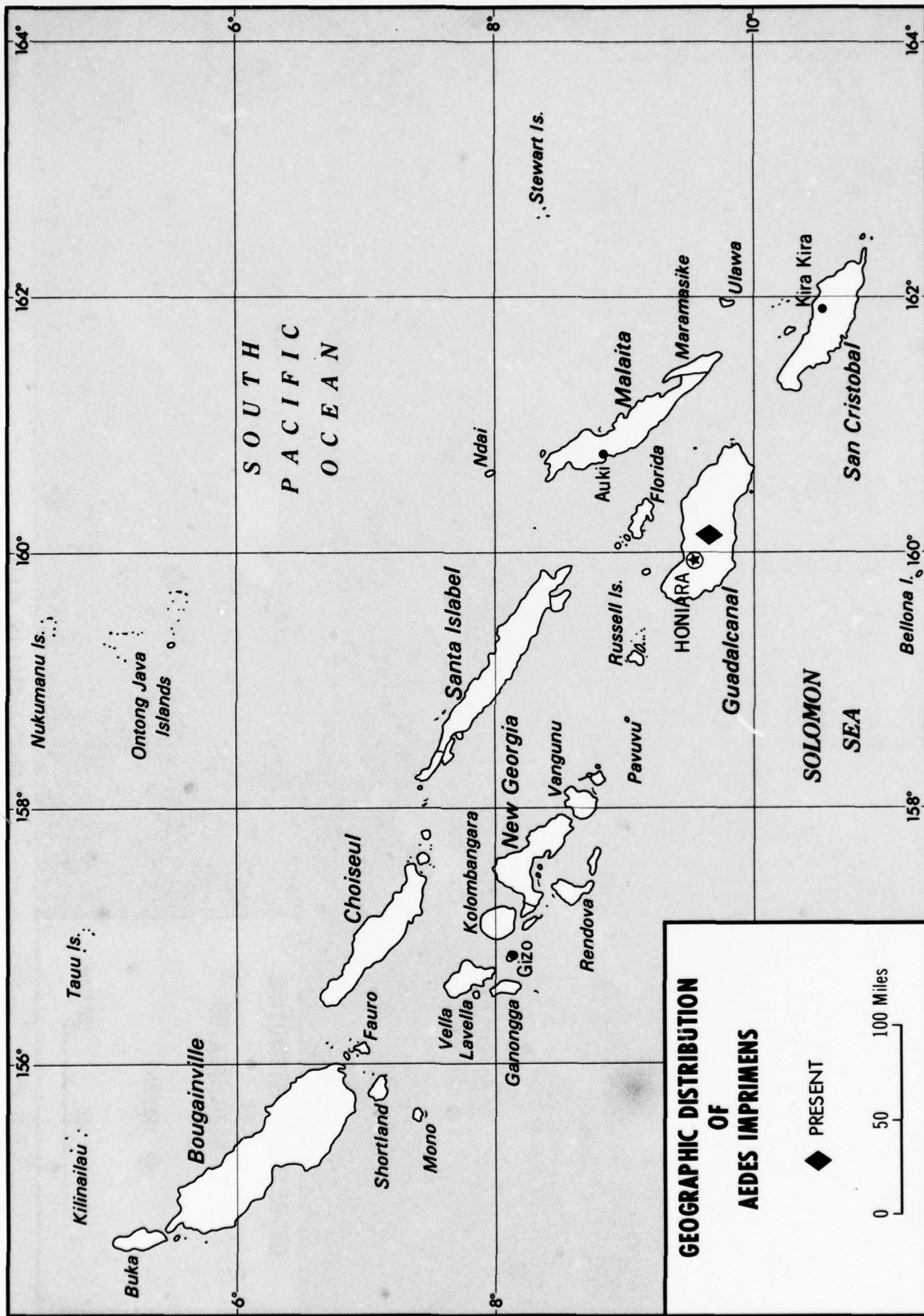


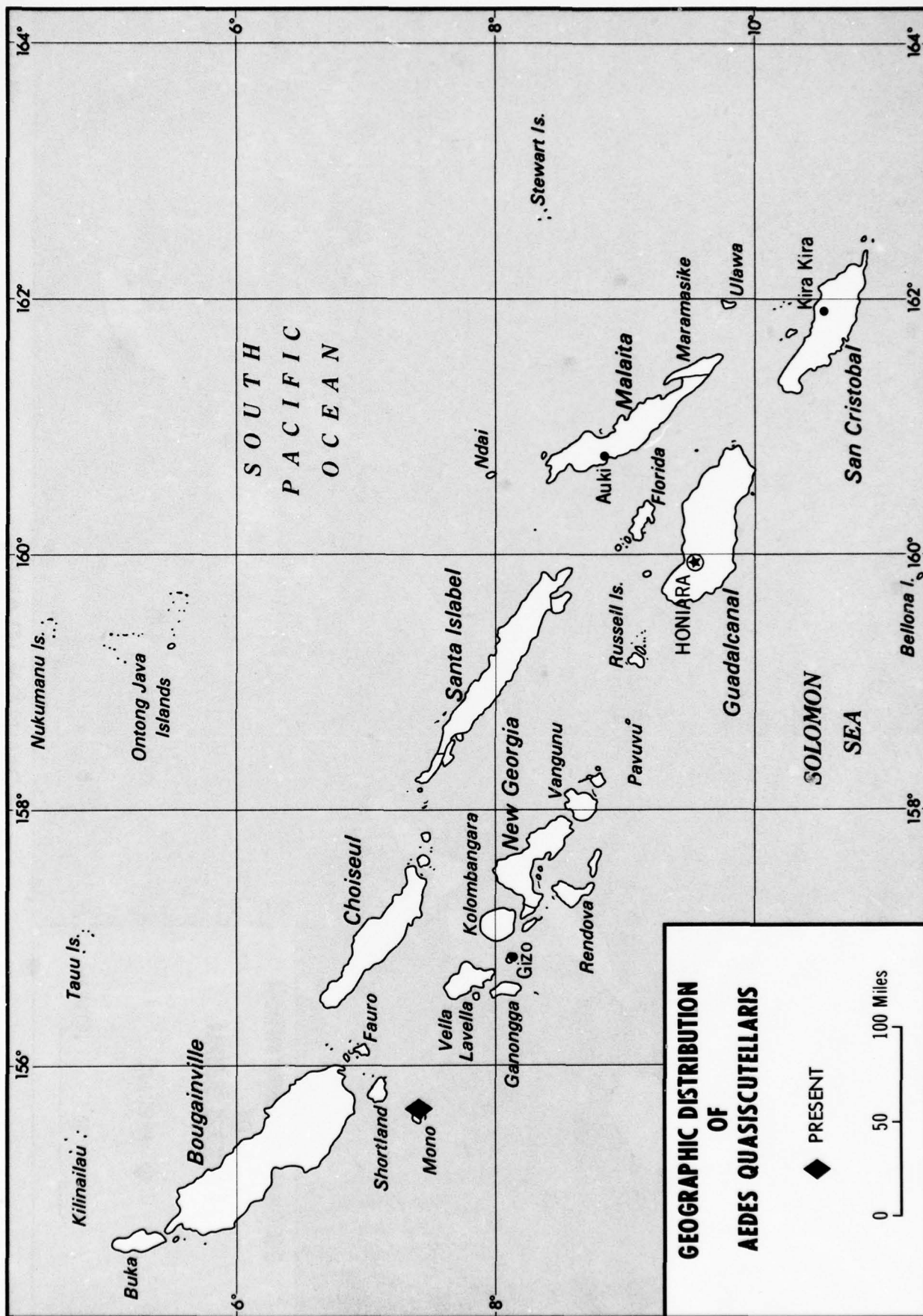


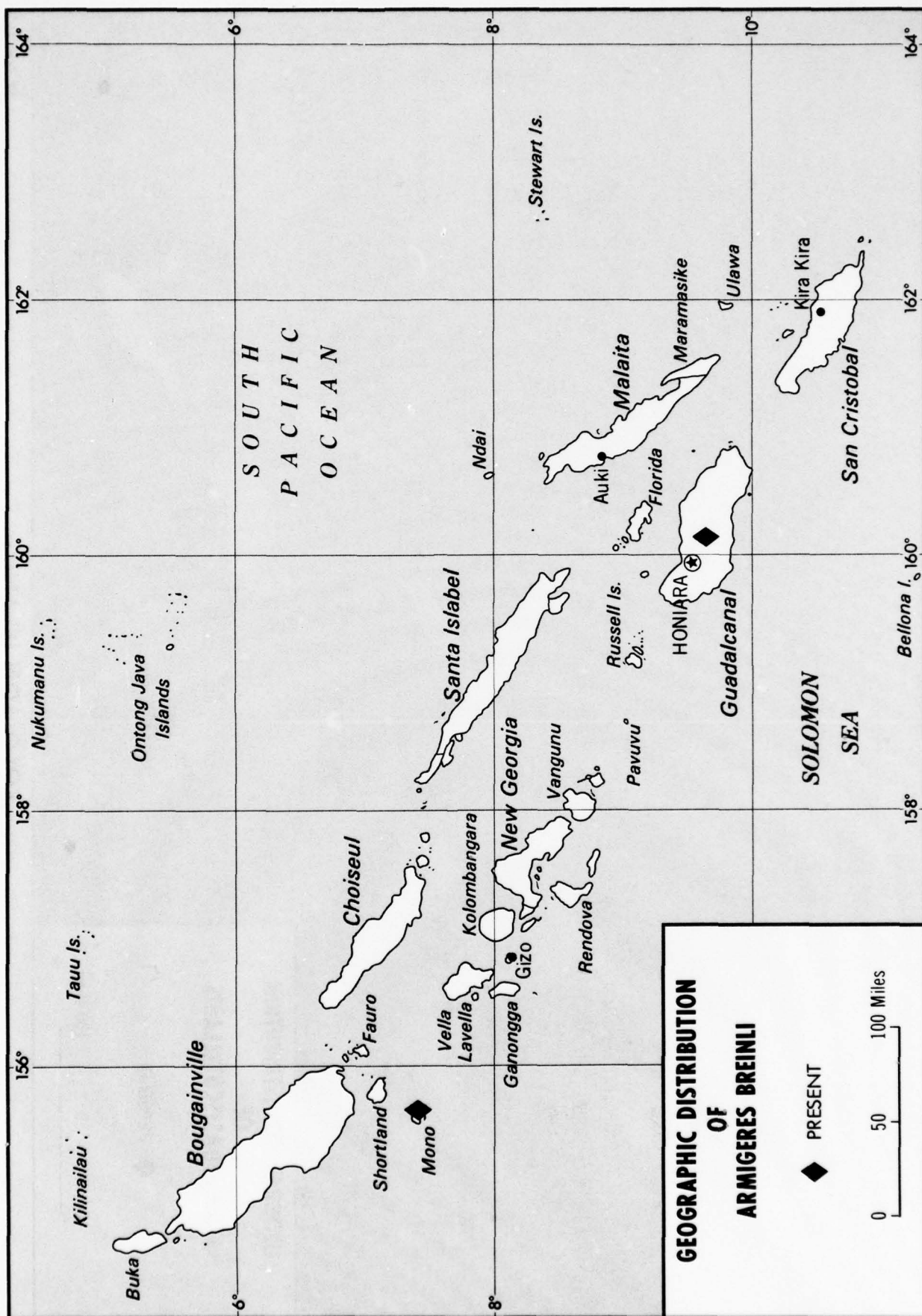


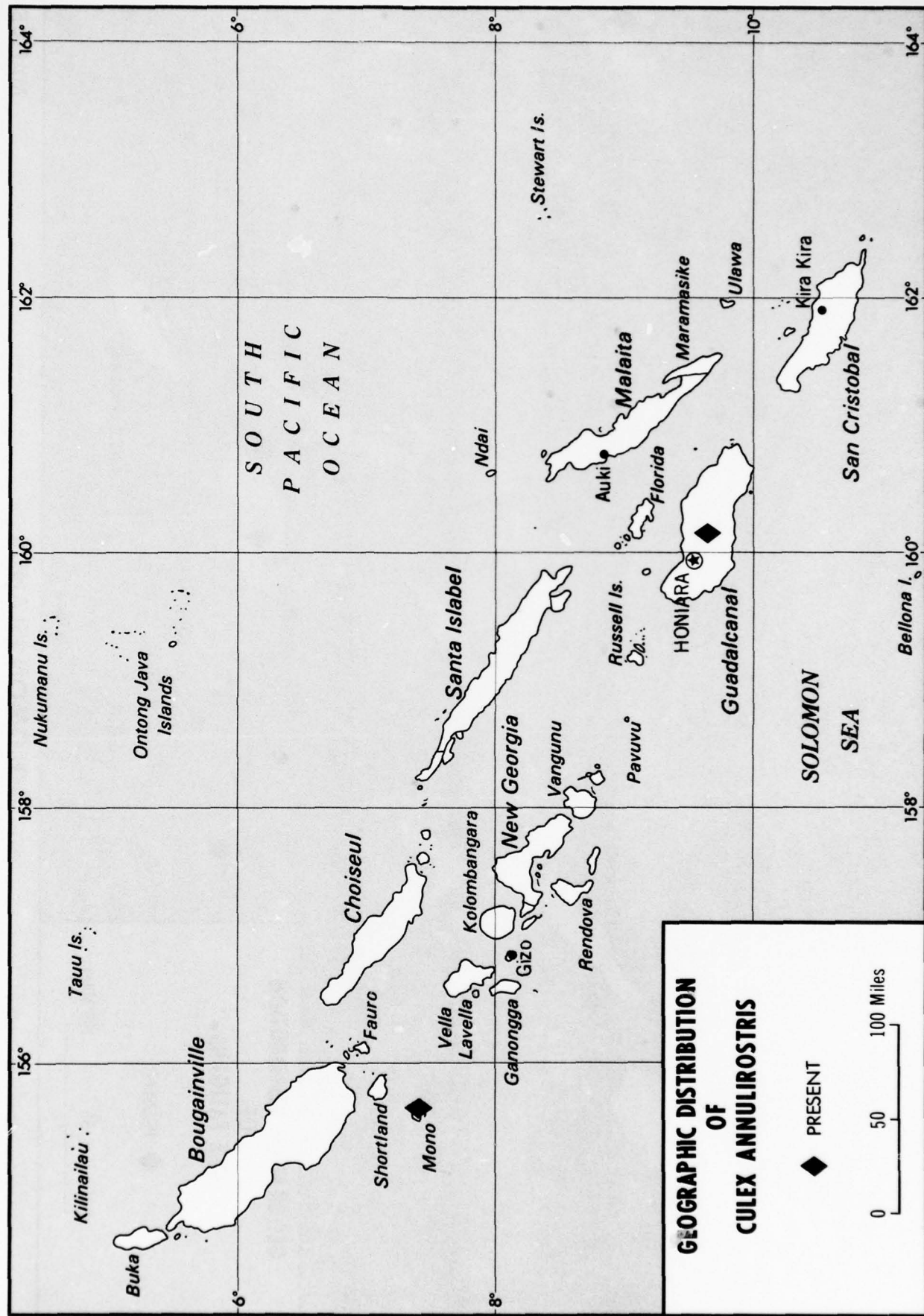


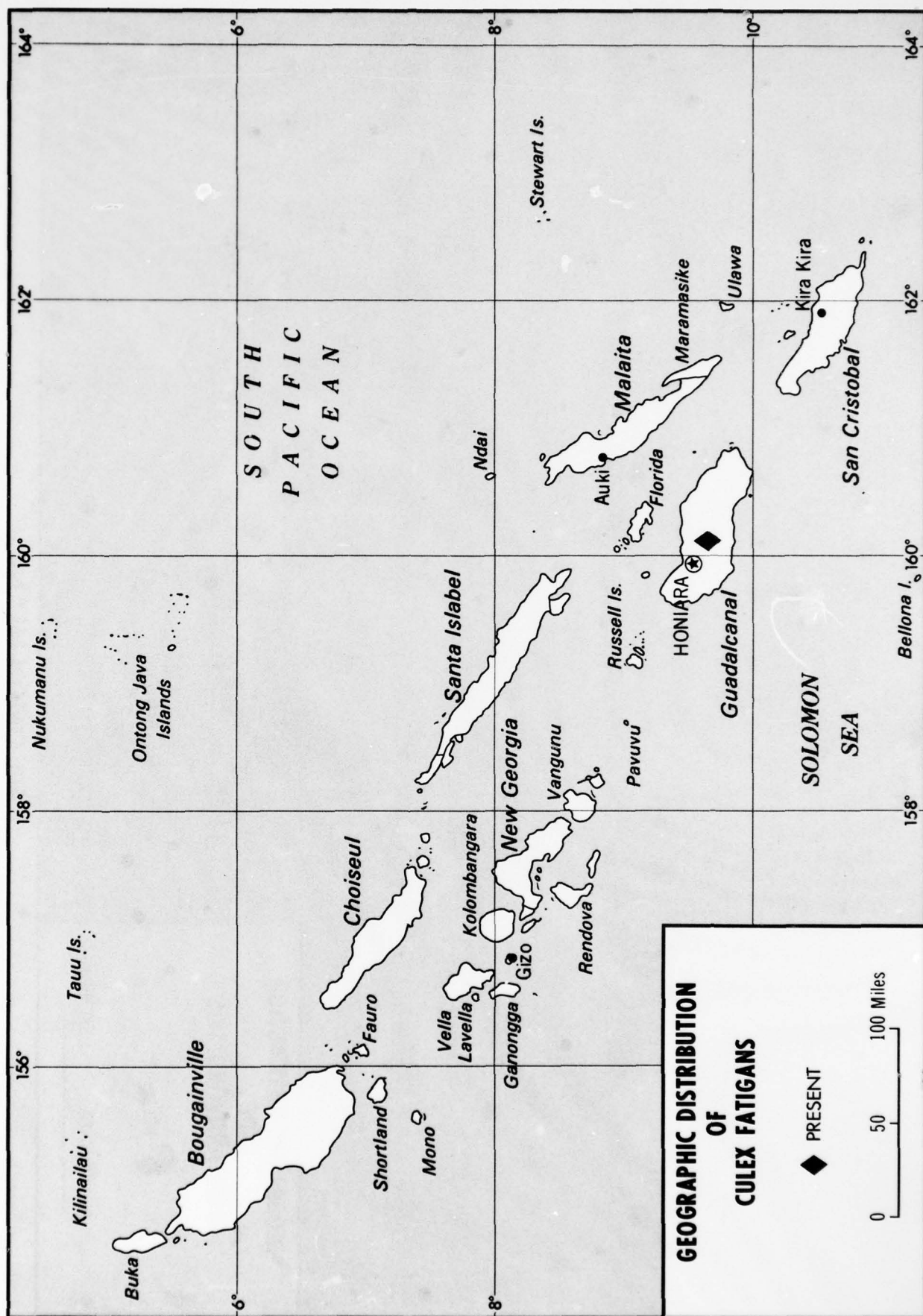


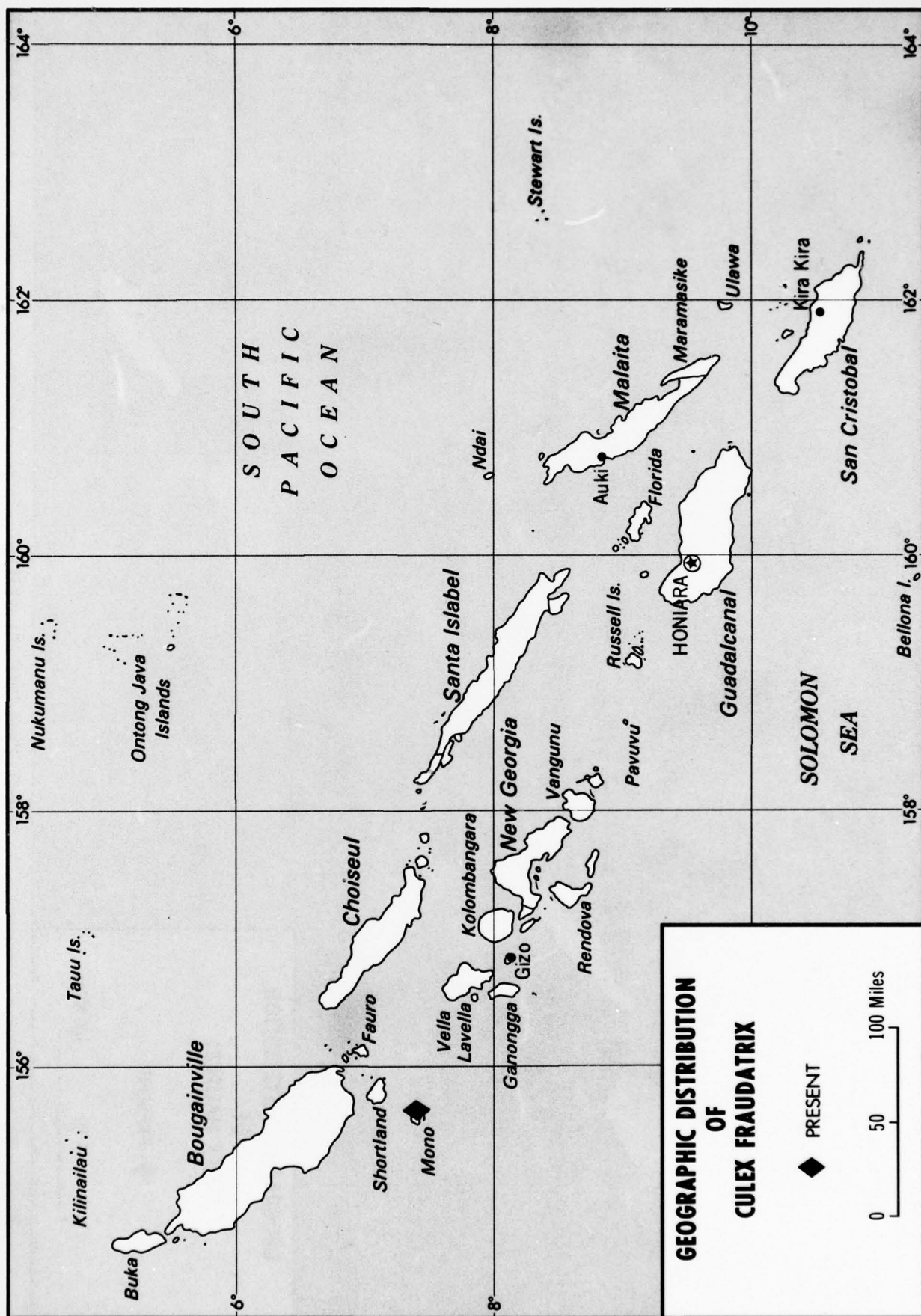


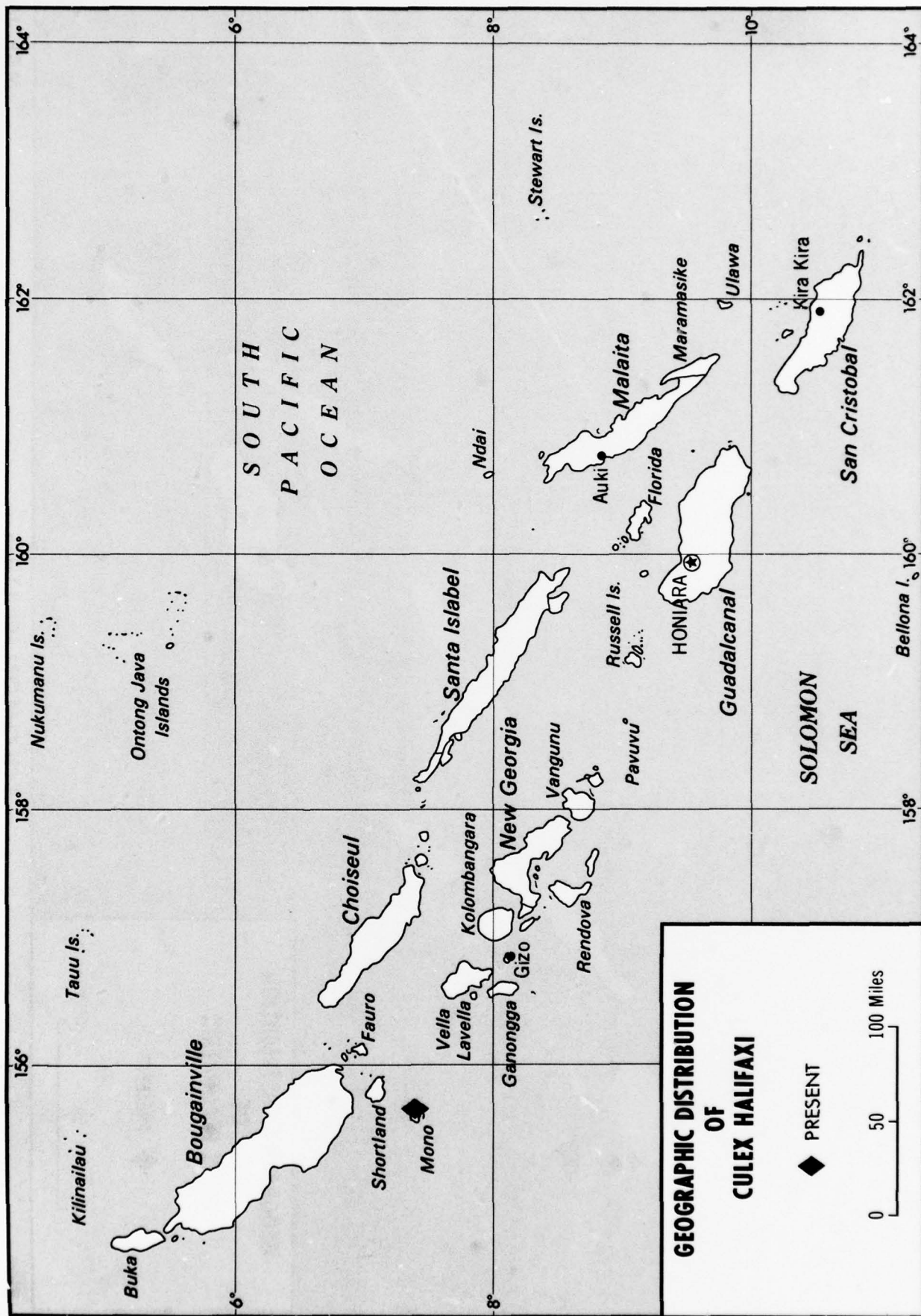


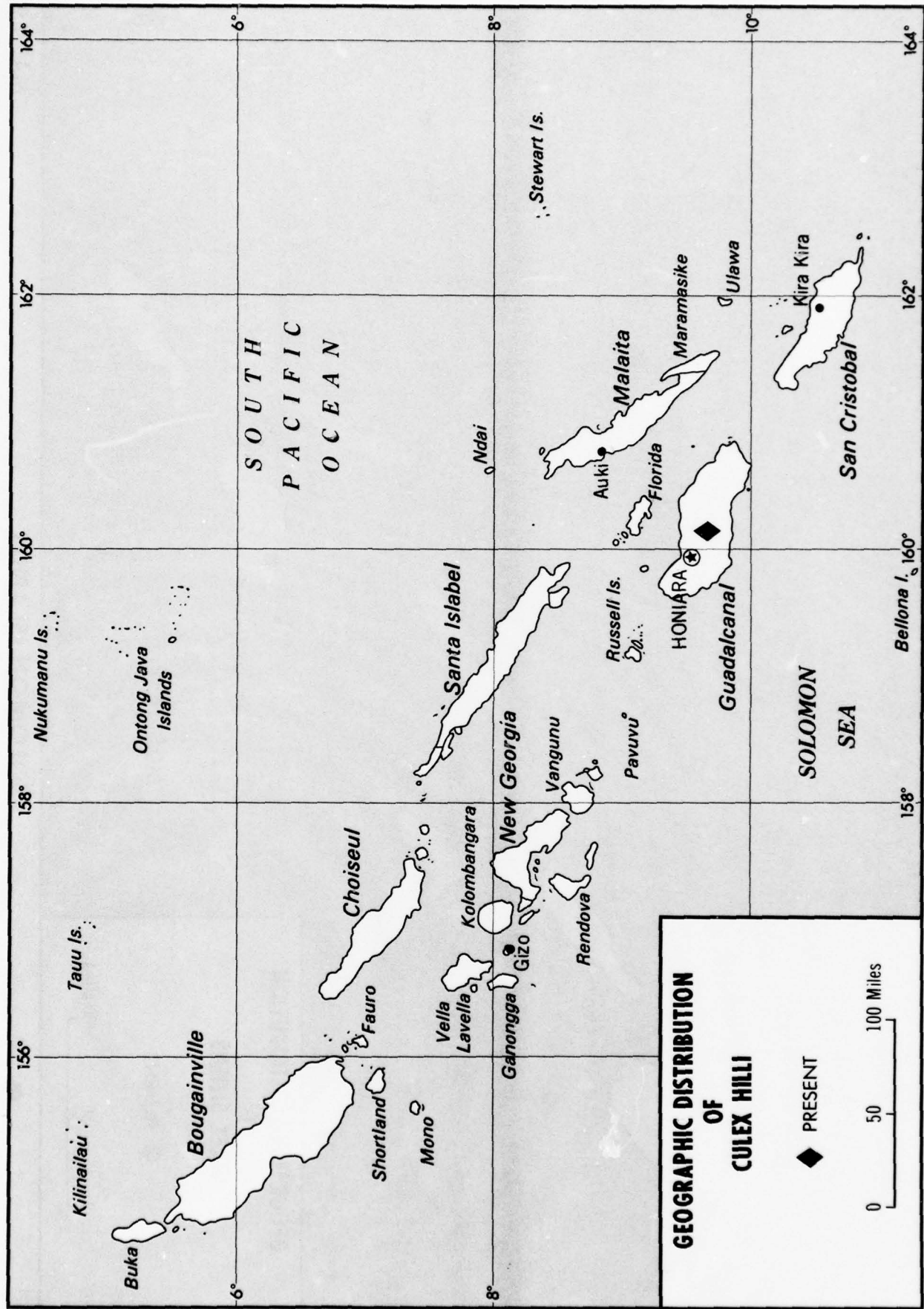


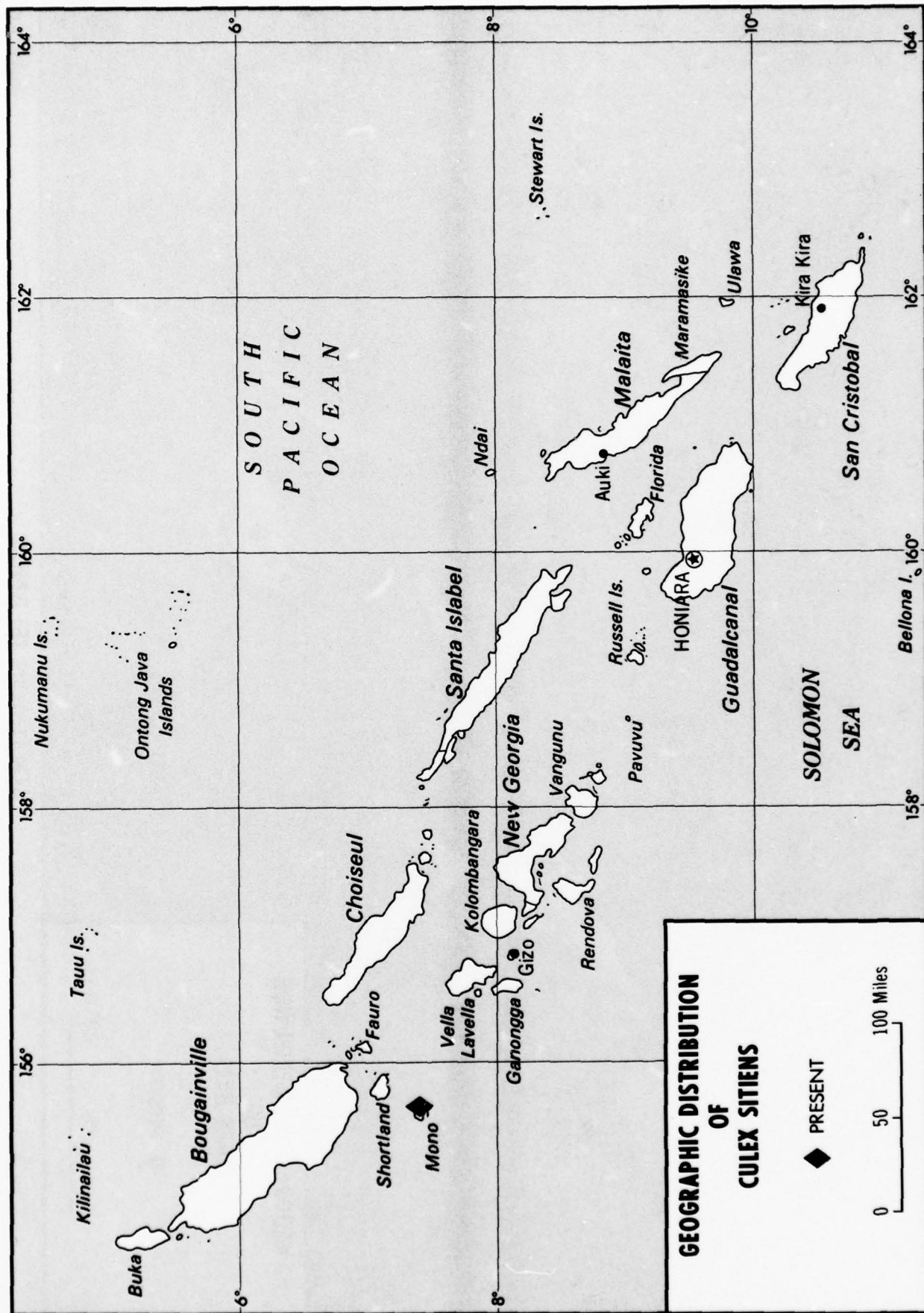


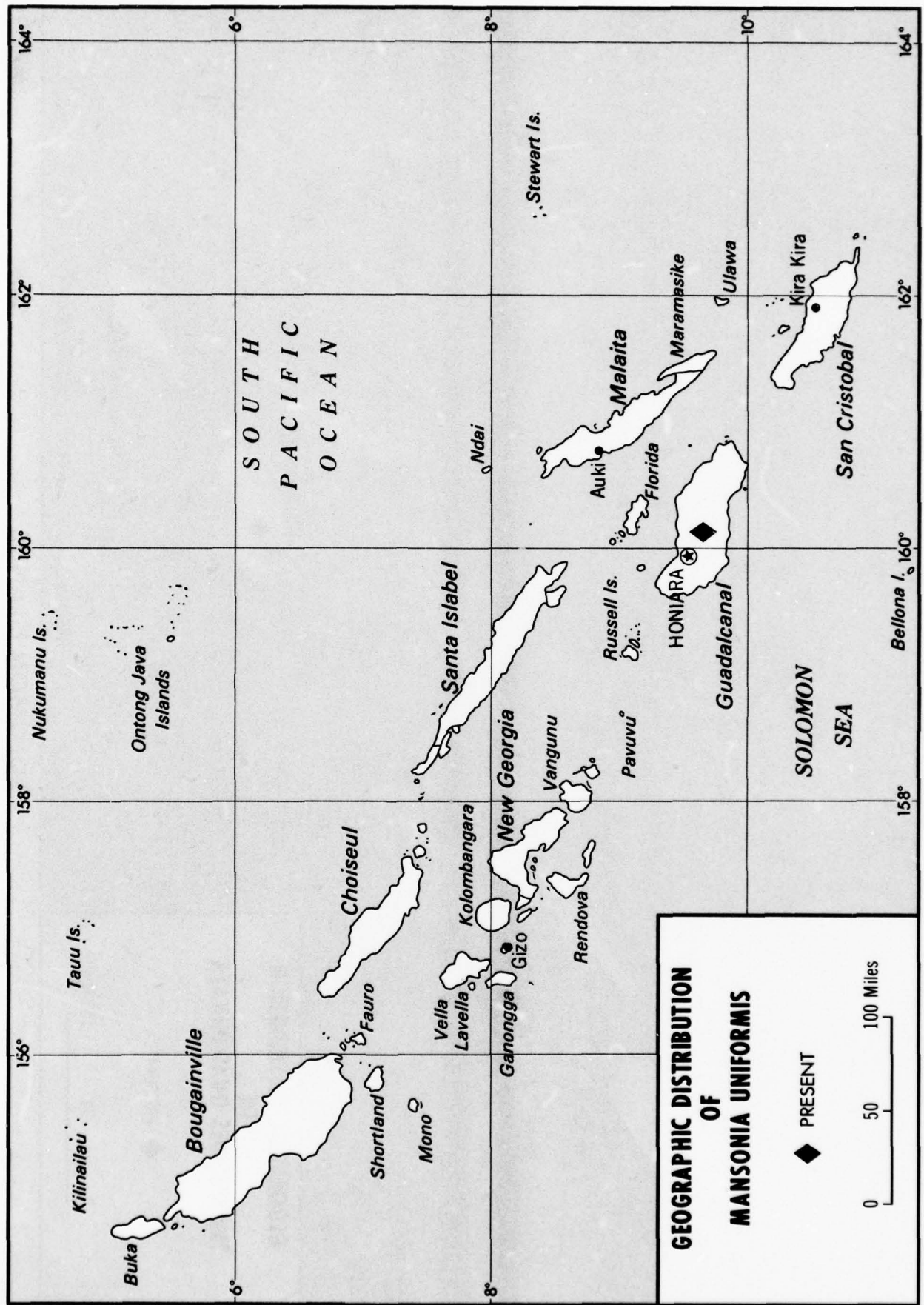


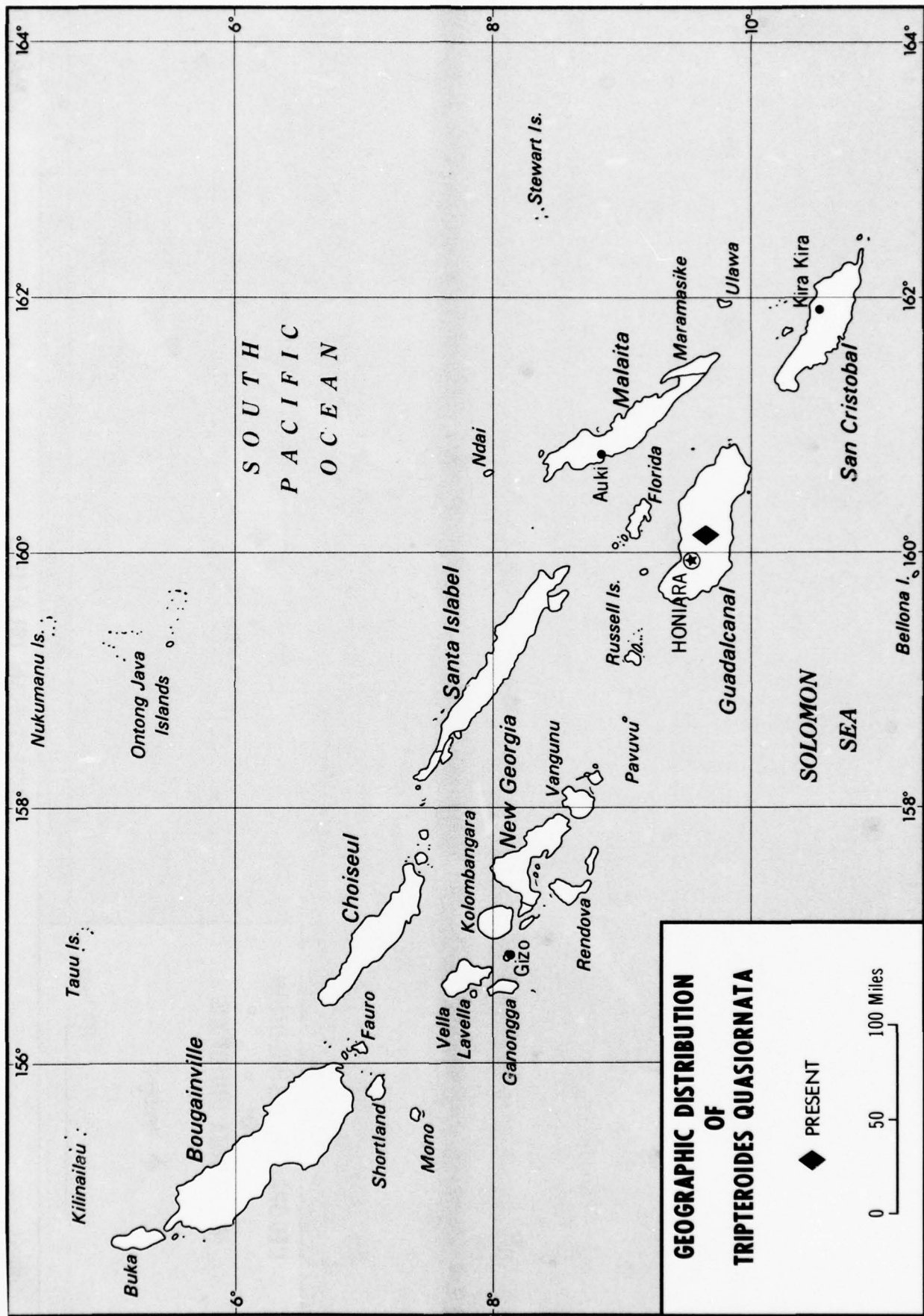


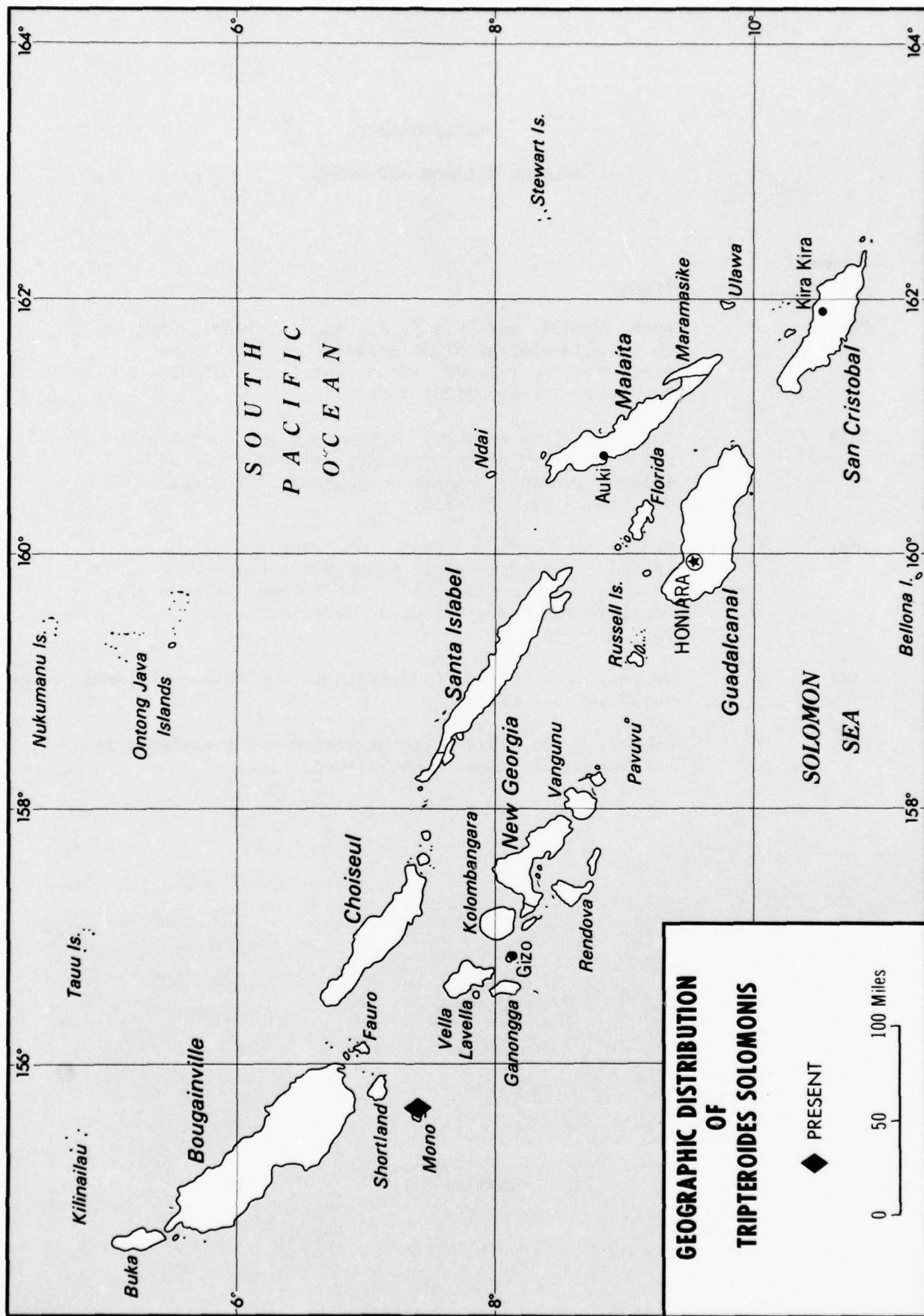












BIBLIOGRAPHY

SOLOMON ISLANDS AND HUMAN

Document Number	Source
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific Islands. South Pacific Commission Technical Paper. #125: 1-96.
2058	Perry, William J. 1949. Mosquitoes and mosquito borne diseases of the Treasury Islands (British Solomon Islands). American Journal of Tropical Medicine. 29: 747-758.
2091	Schlosser, Ralph J. 1945. Observations on the incidence of <u>Wuchereria bancrofti</u> larvae in the native population of the Solomon Islands area. American Journal of Tropical Medicine. 25: 493-495.
2147	Webber, R. H. 1974. Filariasis in the Solomon Islands. Unpublished. 1-12.
2161	Webber, R. H. 1974. Vector control of filariasis in the Solomon Islands. Unpublished. 1-11.

BIBLIOGRAPHY

SOLOMON ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125: 1-96.
2058	Perry, William J. 1949. Mosquitoes and mosquito borne diseases of the Treasury Islands (British Solomon Islands). American Journal of Tropical Medicine. 29: 747-758.
2103	Deland, C. M. 1951. Filariasis in Melanesia. Trans. Roy. Soc. Trop. med/hyg. 44: 610.
2109	Perry, William J. 1950. Principal larval and adult habitats of <u>Anopheles farauti</u> lav. in the British Solomon Islands. Mosquito News. 10 (3): 117-126.
2147	Webber, R. H. 1974. Filariasis in the Solomon Islands. Unpublished. 1-12.
2161	Webber, R. H. 1974. Vector control of filariasis in the Solomon Islands. Unpublished. 1-11.

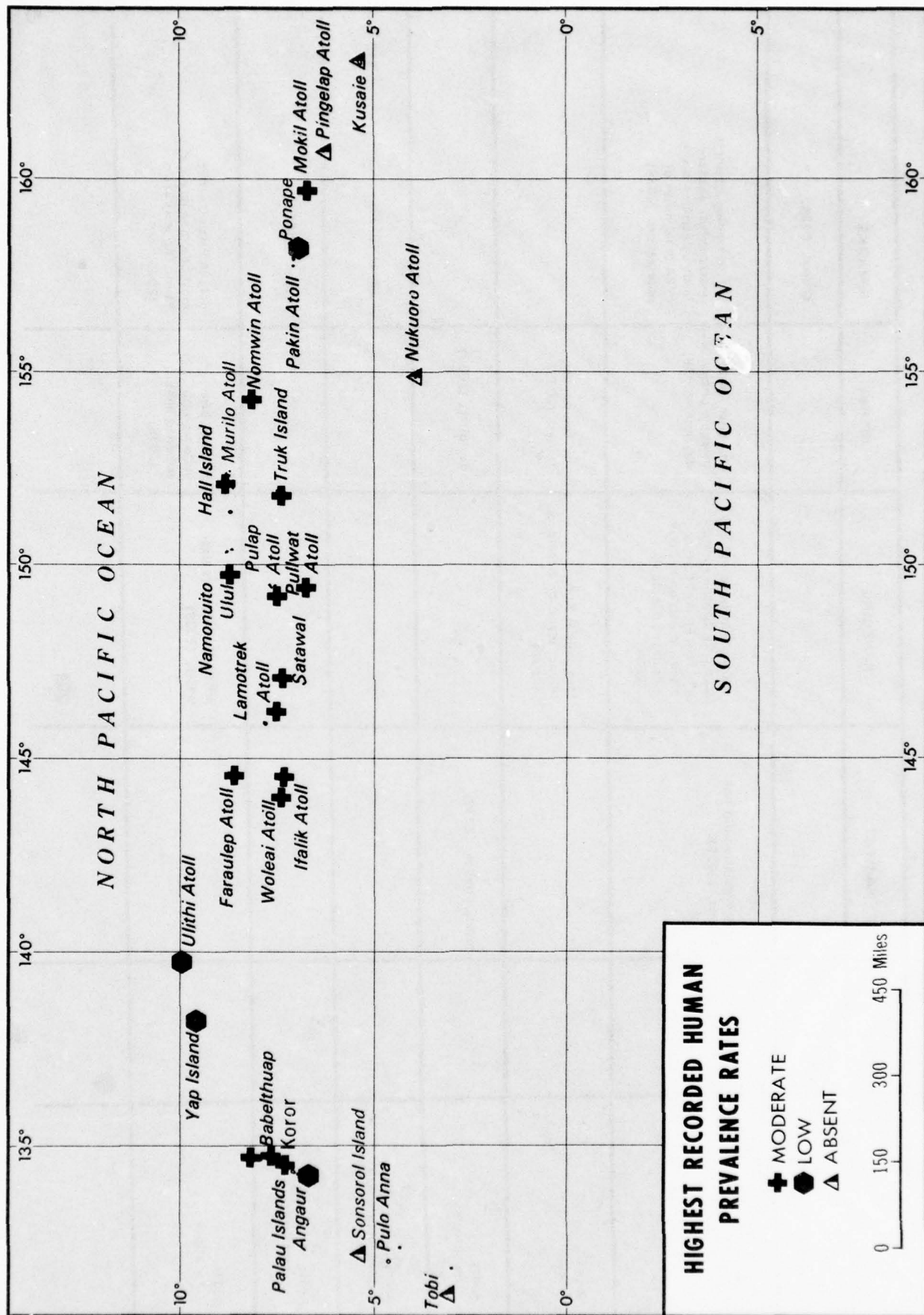
P. Caroline Islands

1. Human Data

Of the information in the Disease Information System, the last survey of the Caroline Islands was taken in 1952. There is not indication of any mosquito control or treatment measures being undertaken. The geographic distribution of the prevalence rates can be found in Map 93.

2. Mosquito Data

Information on the role and the bionomics of the various mosquitoes in the Caroline Islands can be found in Table 24. Information on the geographic distribution of the various mosquito species is presented in Maps 94 to 105.



CAROLINE ISLANDS

Table 24

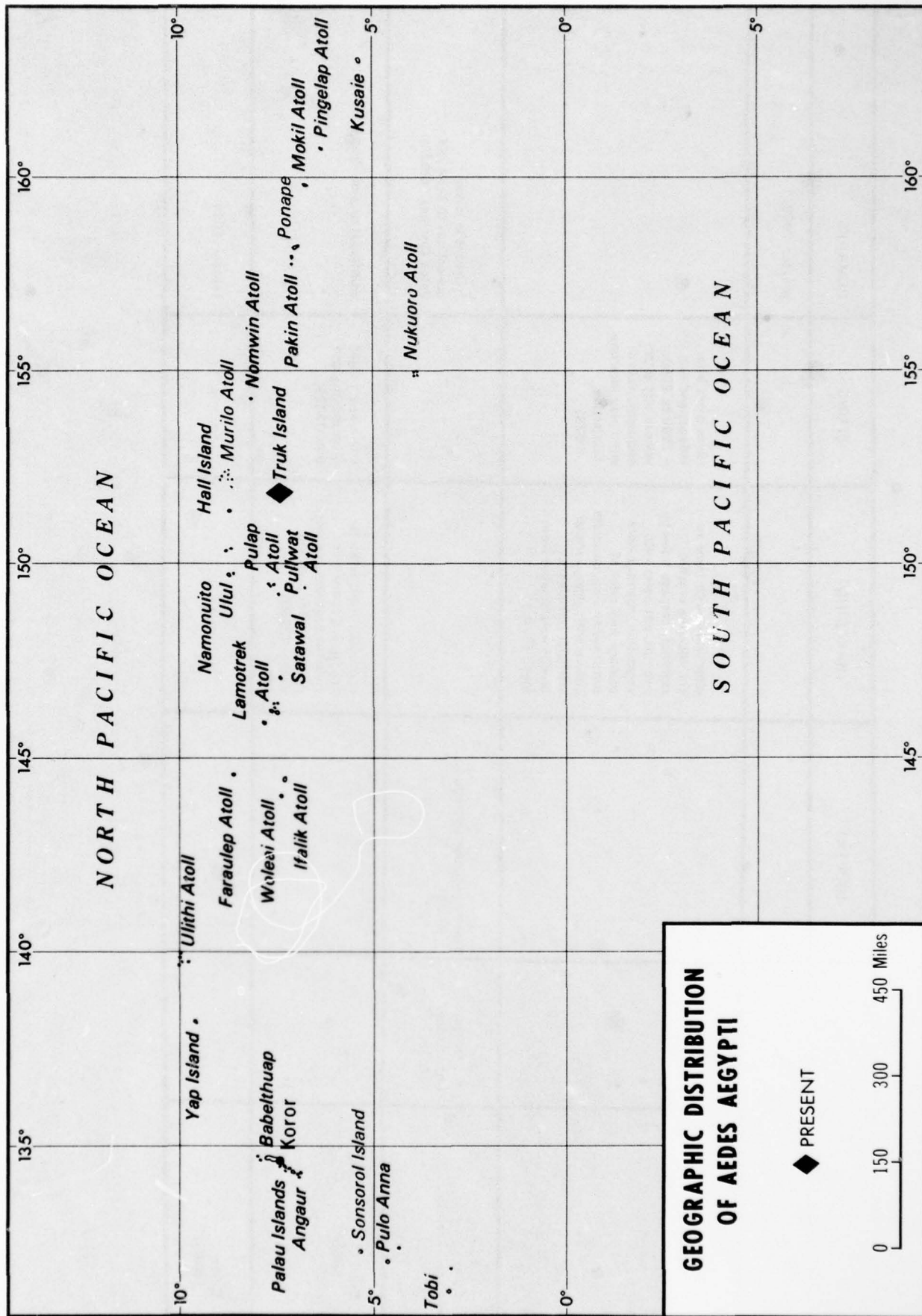
CAROLINE ISLANDS — MOSQUITO DATA

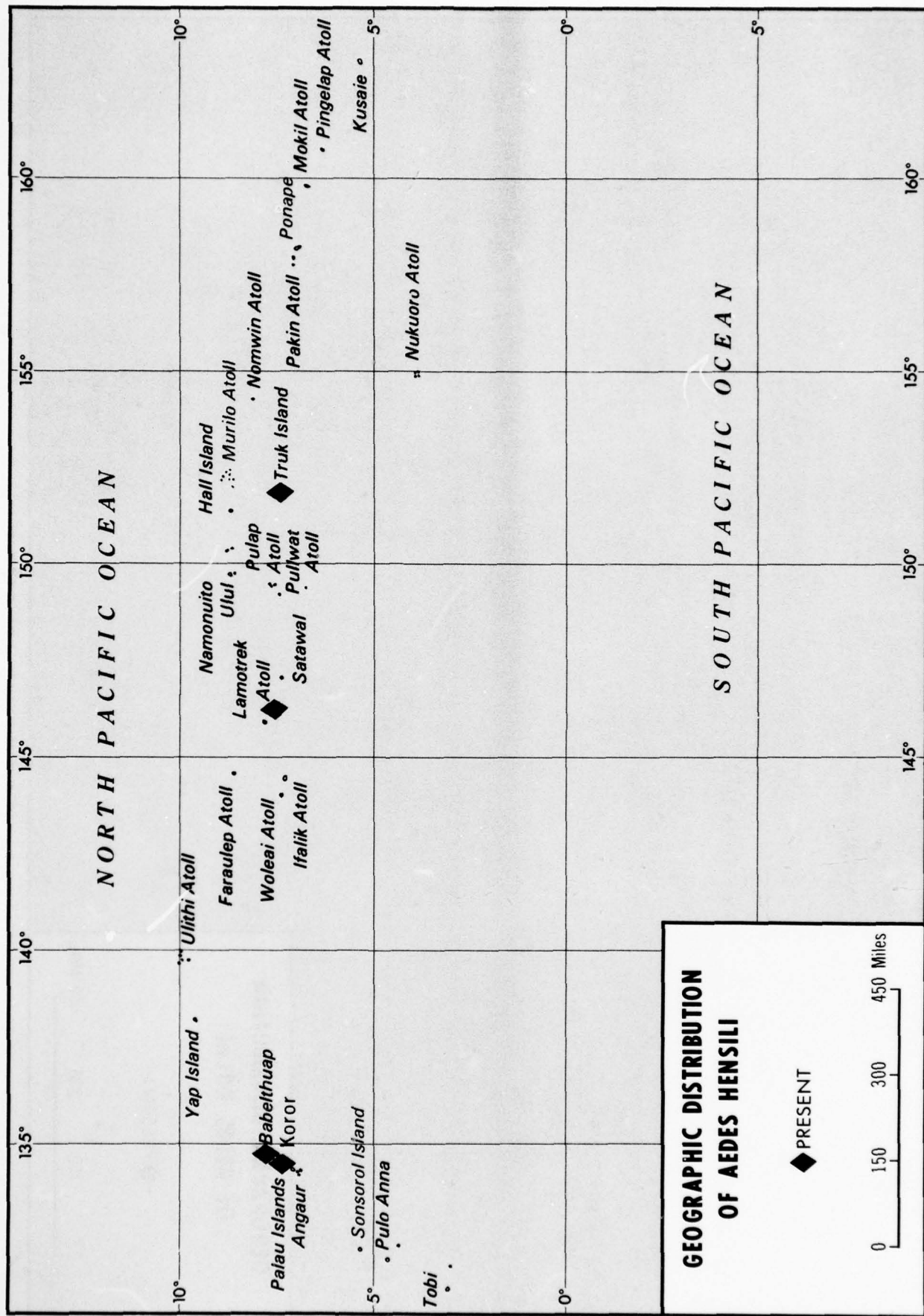
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes aegypti</i>					source: 2039.
<i>Aedes hensili</i>		deep vegetation but not houses. (2039)	coconut shells, palm trunk step cuts, banana stumps and taro axils at Koror. pitcher plants on red clay hillsides at Babeldob. (2039)	shy biter. early morning or cloudy daytime. (2039)	indoor feeding attempts unsuccessful. outdoor feeds on carrier = death in 24 to 48 hours of observation. (2039)
<i>Aedes kochi</i>			taro axils at Koror. pitcher plants on Babeldob. (2039)	shy, seldom in houses. (2039)	
<i>Aedes moenensis</i>		grassy ditches. (2039)		day biter. (2039)	
<i>Aedes pseudoscutellaris</i>					absent. (2133)
<i>Aedes scutoscriptus</i>					source: 2039.
<i>Aedes zonatipes</i>			artificial containers clear water. (2039)	shy day biter. indoors with subdued light. (2039)	only in Palau District. most common larvae at Koror. none at Truk. (2039)
			204		

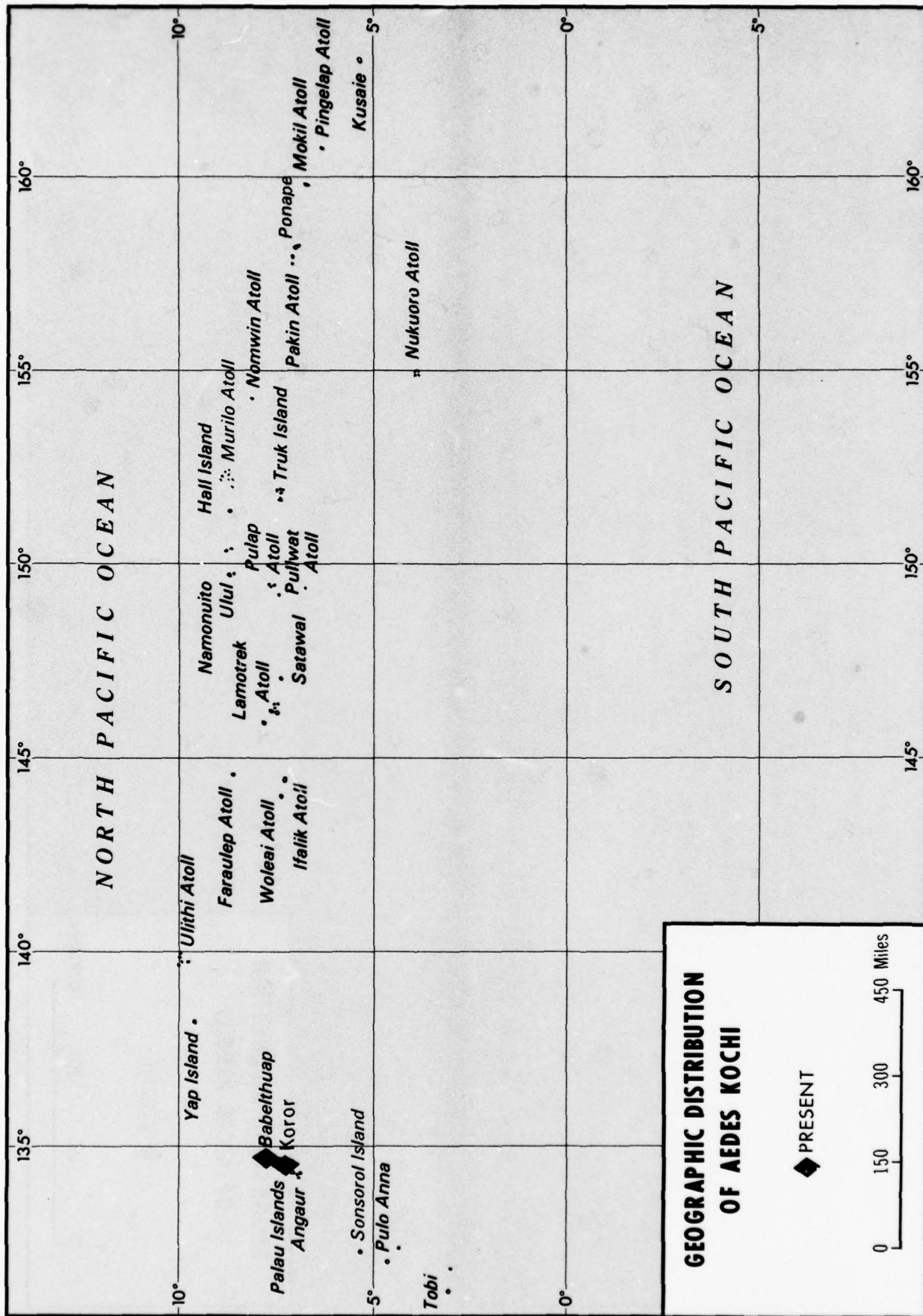
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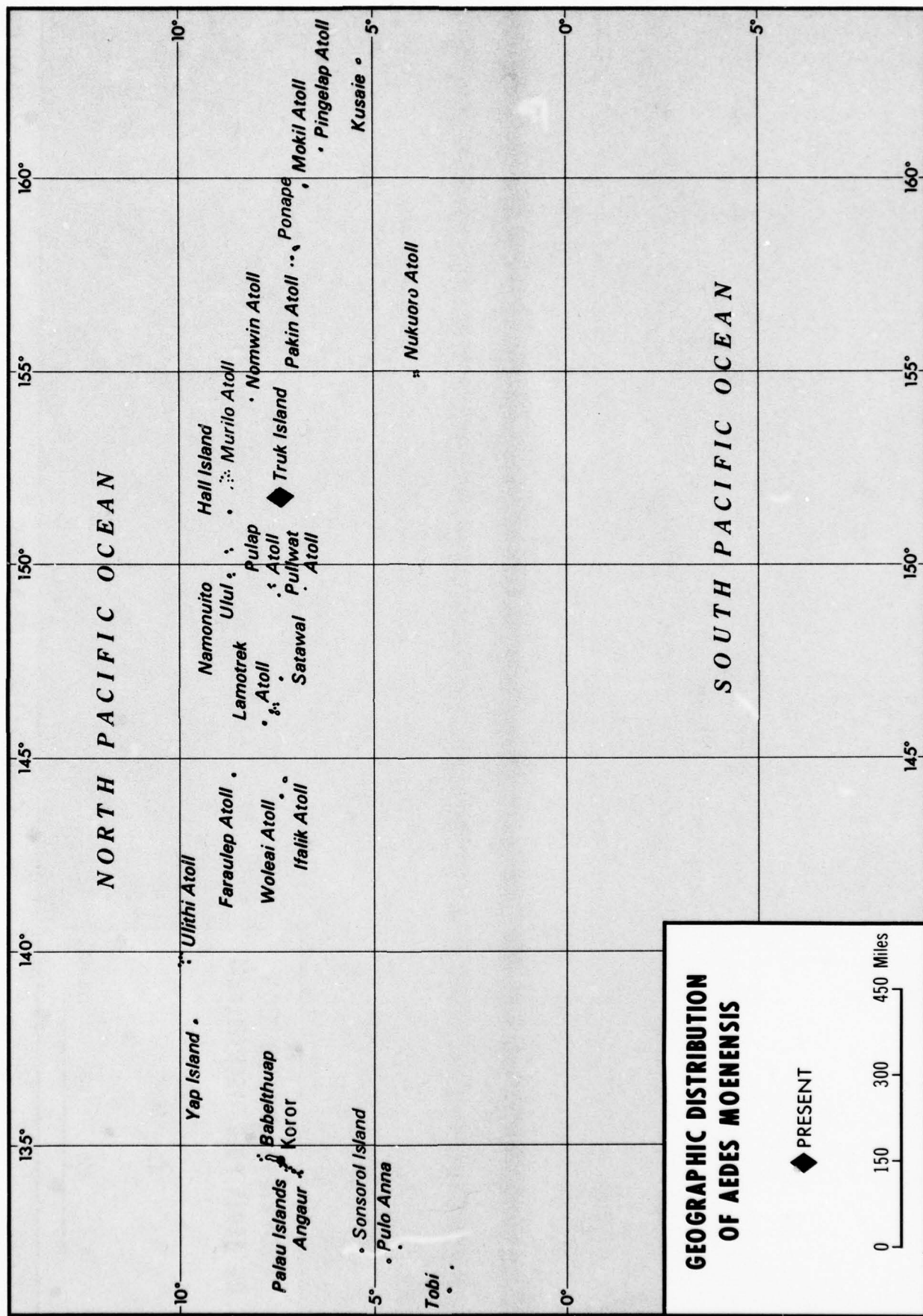
CAROLINE ISLANDS - MOSQUITO DATA

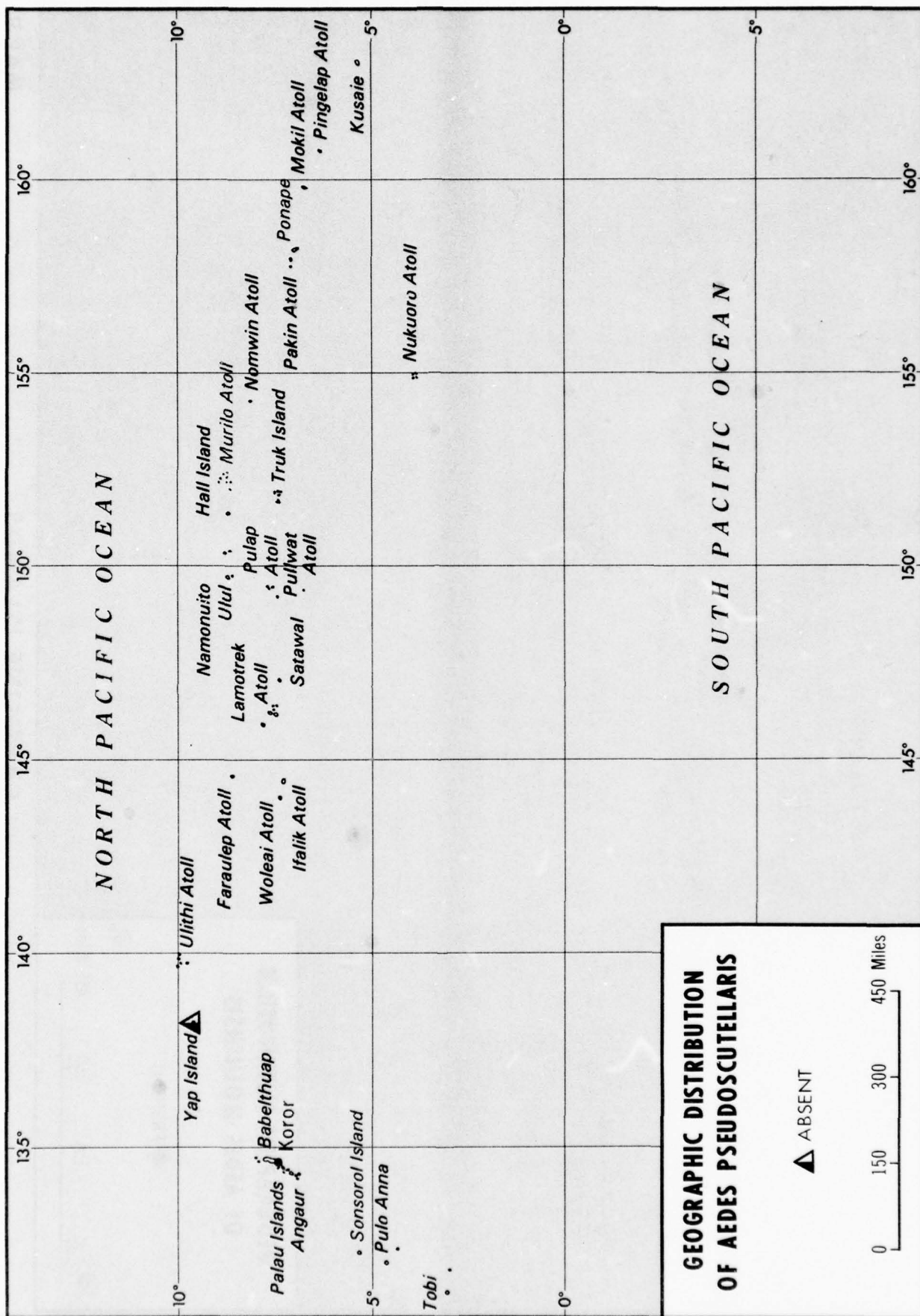
	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes zonatpeg</i>					source: 2039.
<i>Culex annulirostris</i>			clear water with some to considerable organic material. seepage holes by swamps, pot holes with vegetation, coconut fibre soakage pits, edge of sulfurous swamp, concrete cistern with algae, various artificial containers. breeds well isolated from man. (2039)	fierce night biter indoors and out -- 2000 to 2200. seldom bite after midnight. rain or wind may interfere with biting. (2039)	
<i>Culex carolinensis</i>	no medical importance. (2039)	rarely in house collections. (2039)			frequent in larval collections in Truk and Palau Districts. (2039)
<i>Culex fatigans</i>			man-made sites, artificial containers, sump holes, coconut fibre soaking pits. preference for polluted water. (2039)	commonest night biter indoors and out. (2039)	additional source: 2113.
<i>Culex pullus</i>					source: 2039

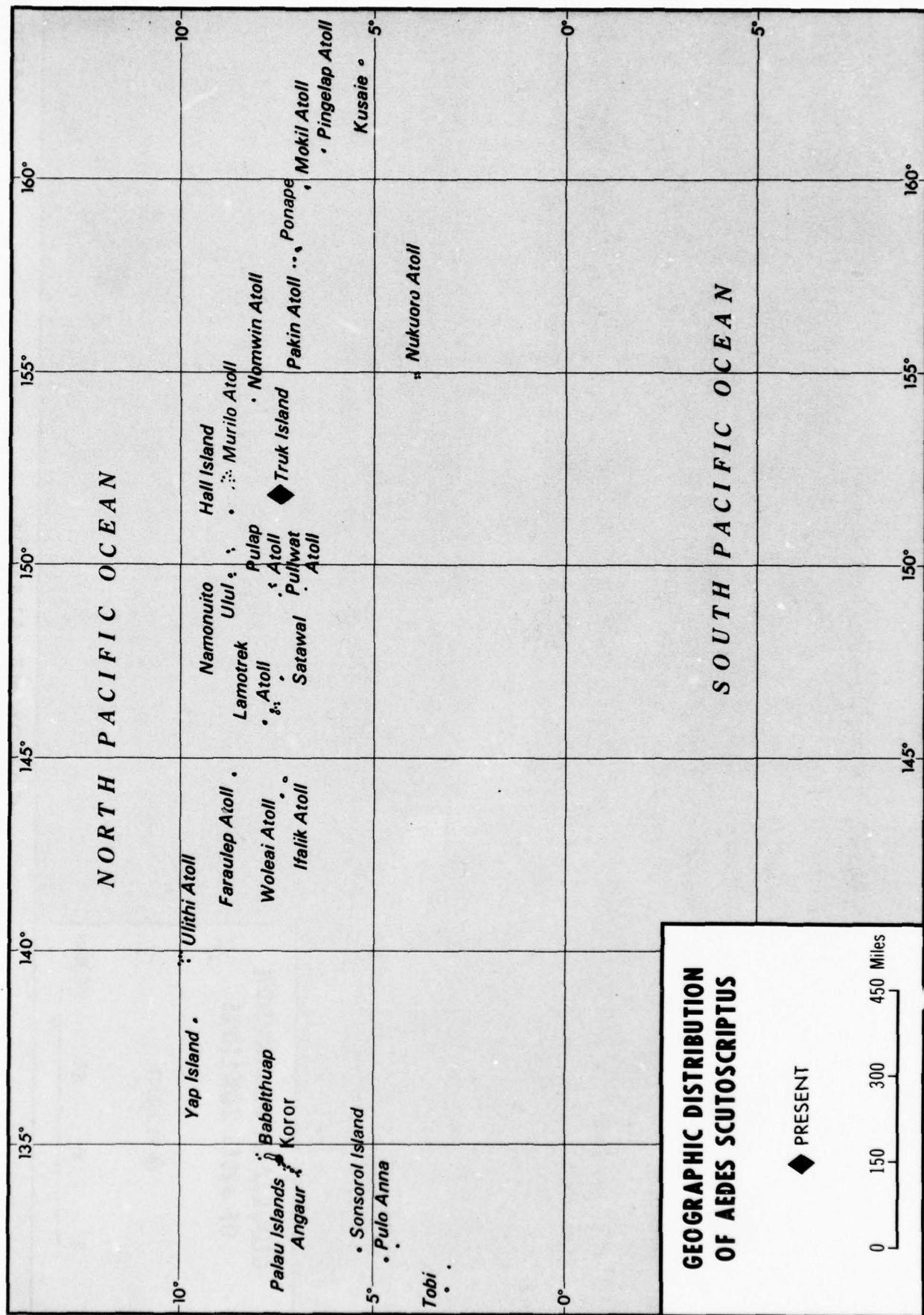


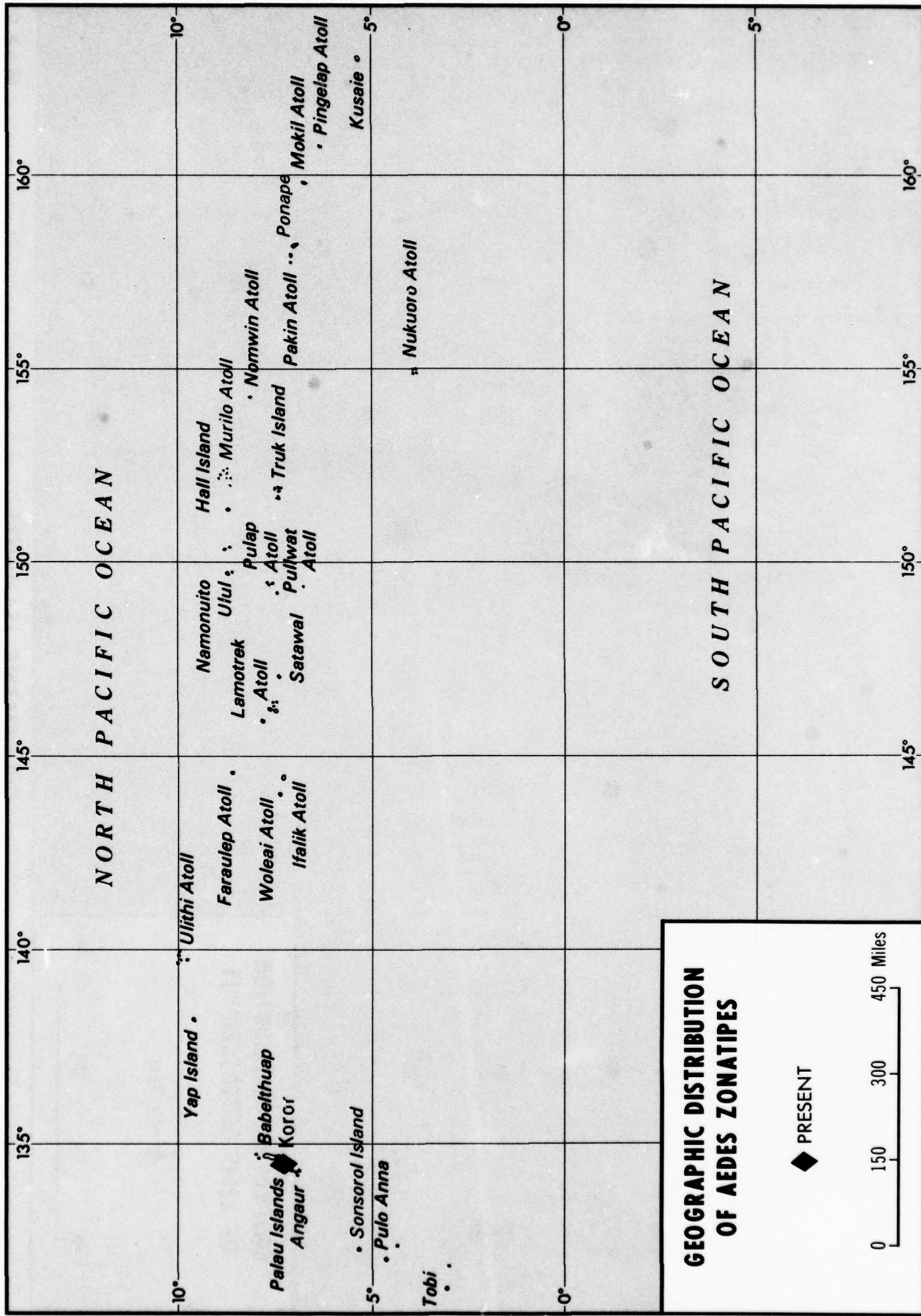


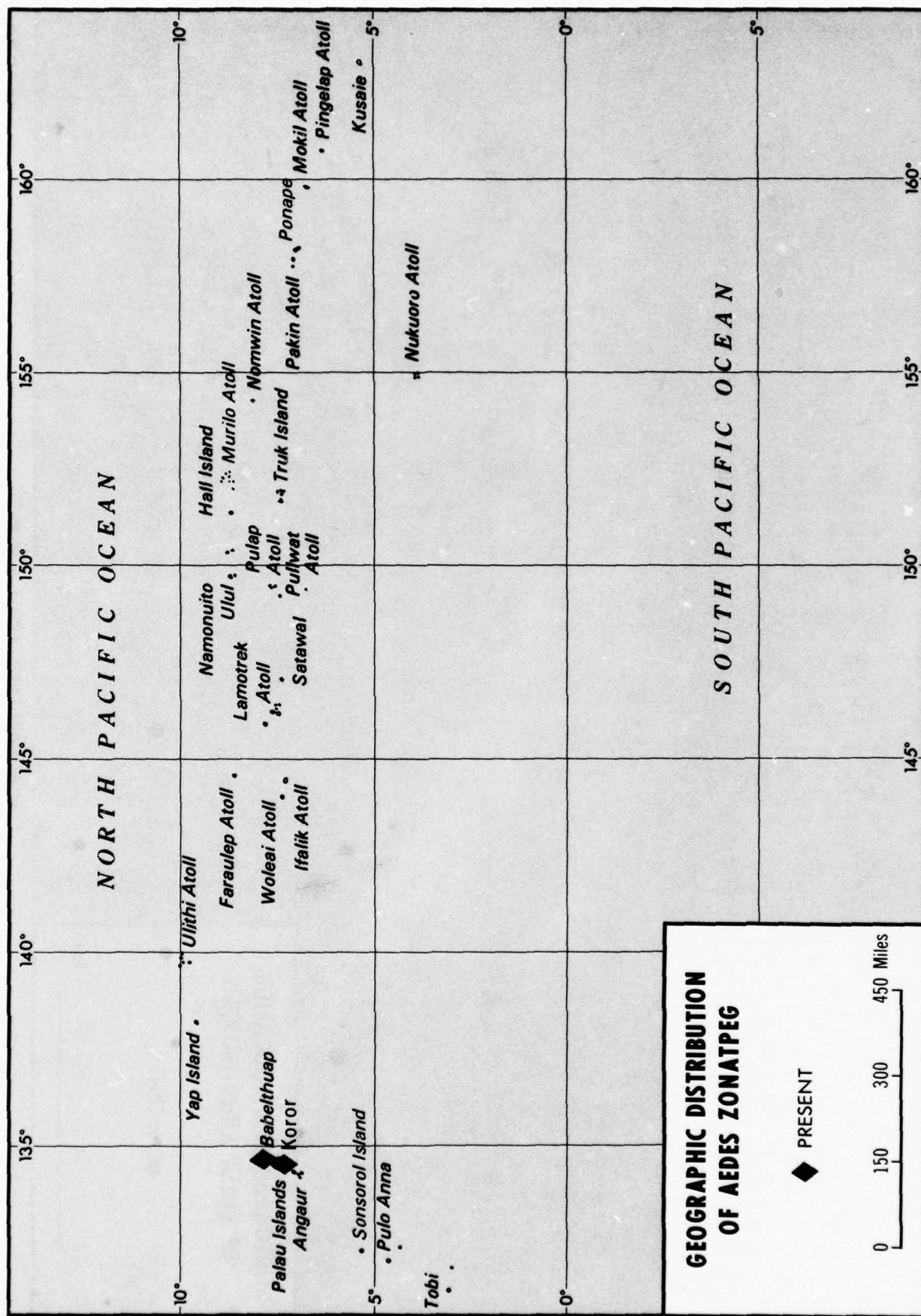


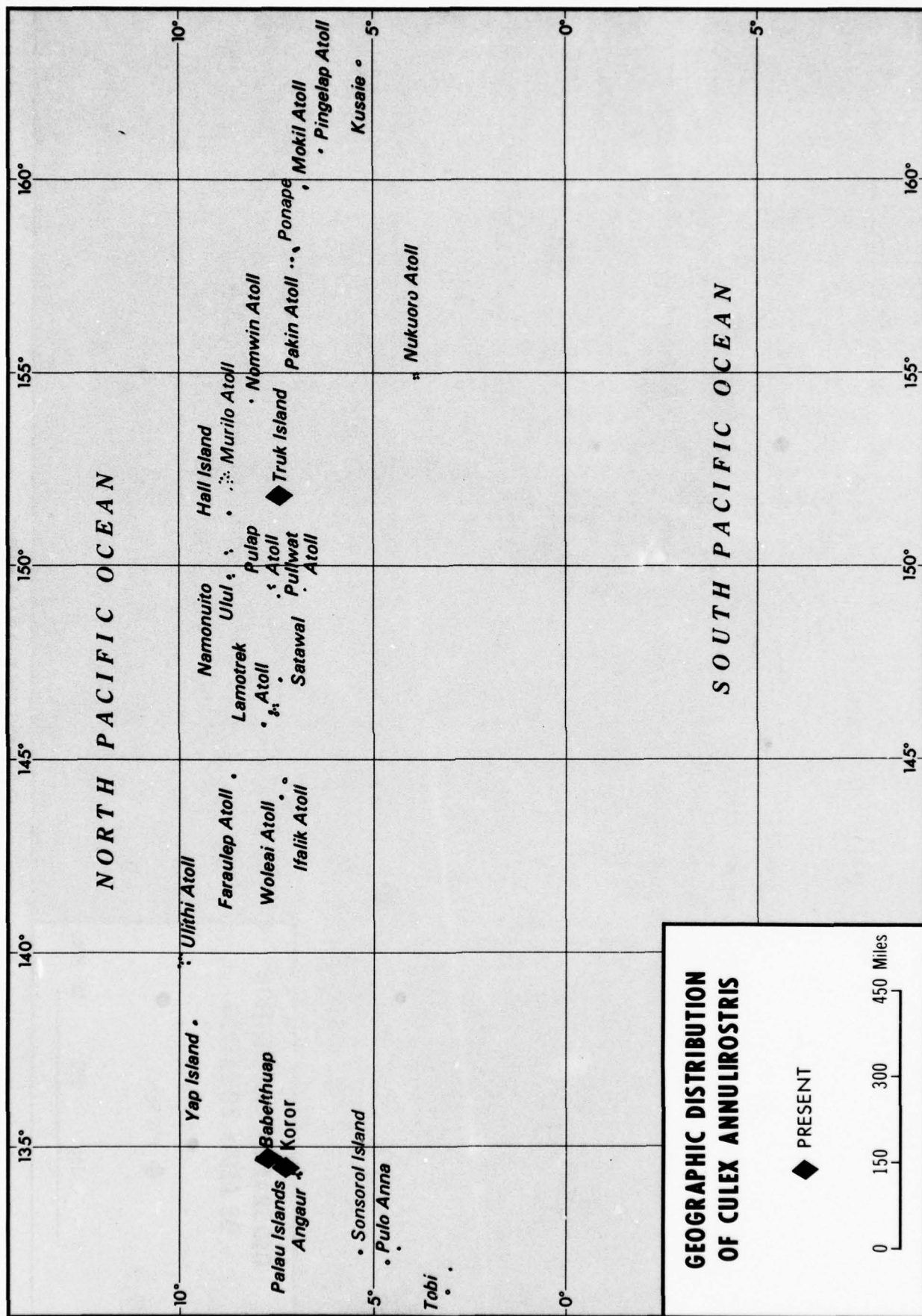


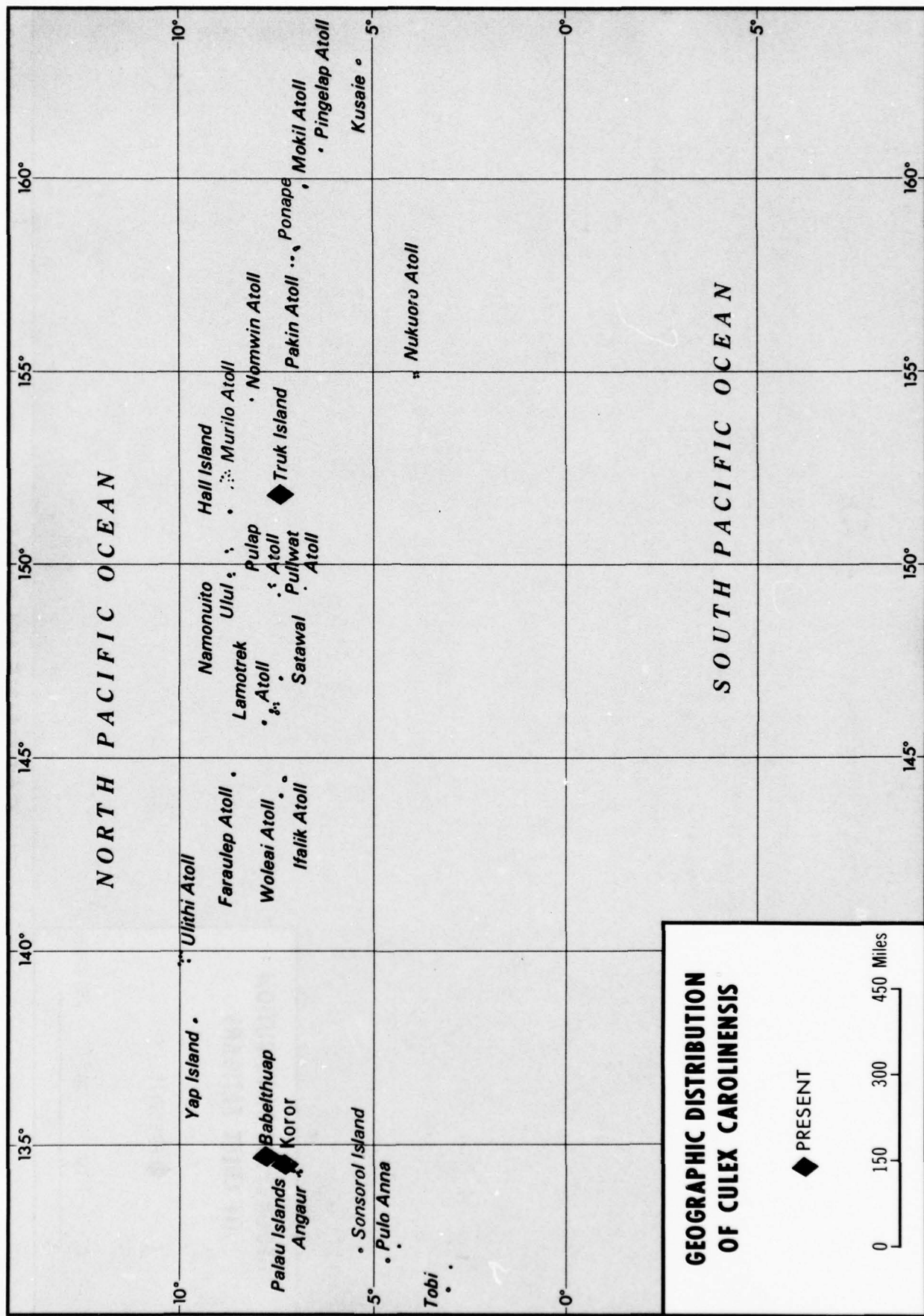


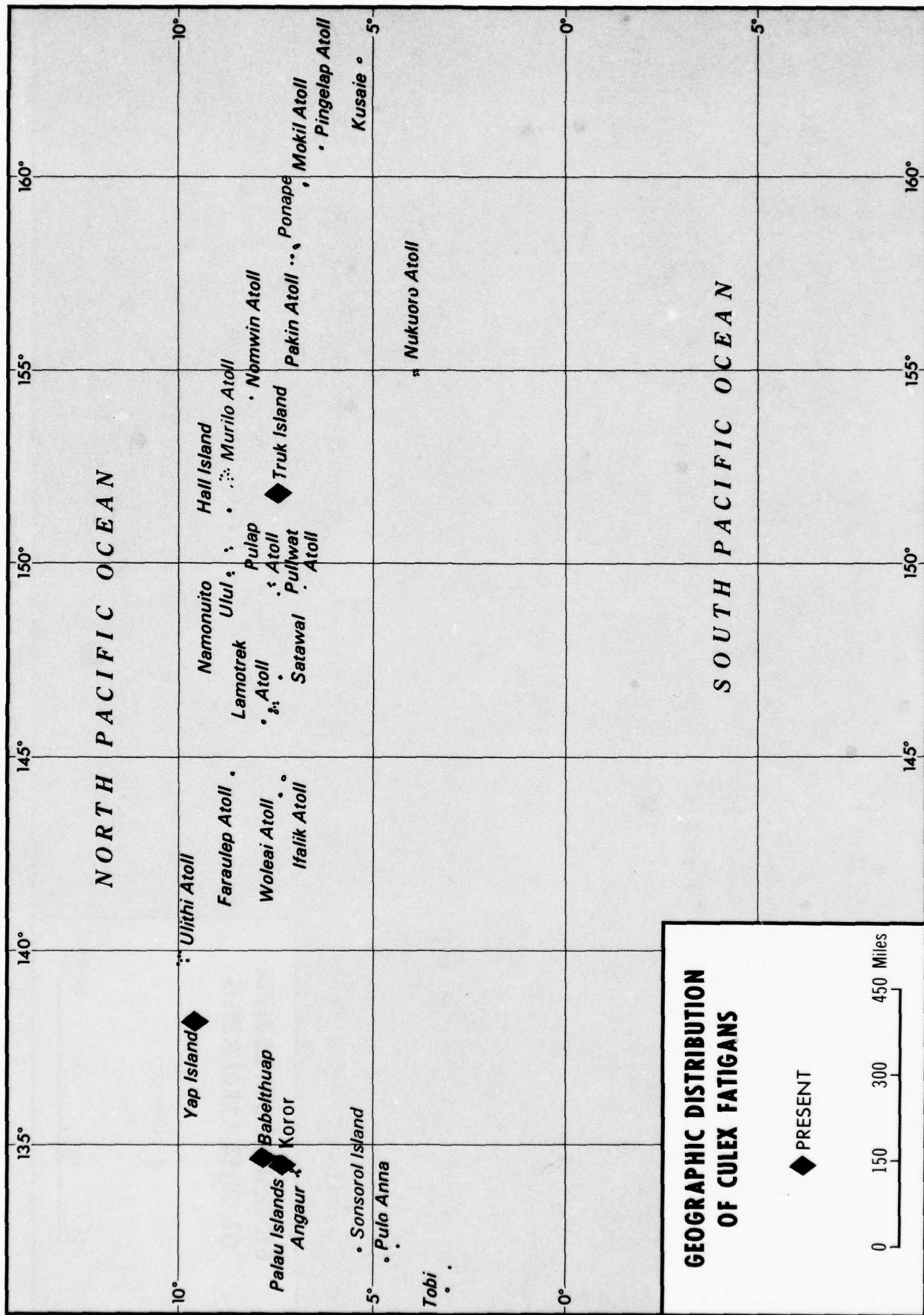


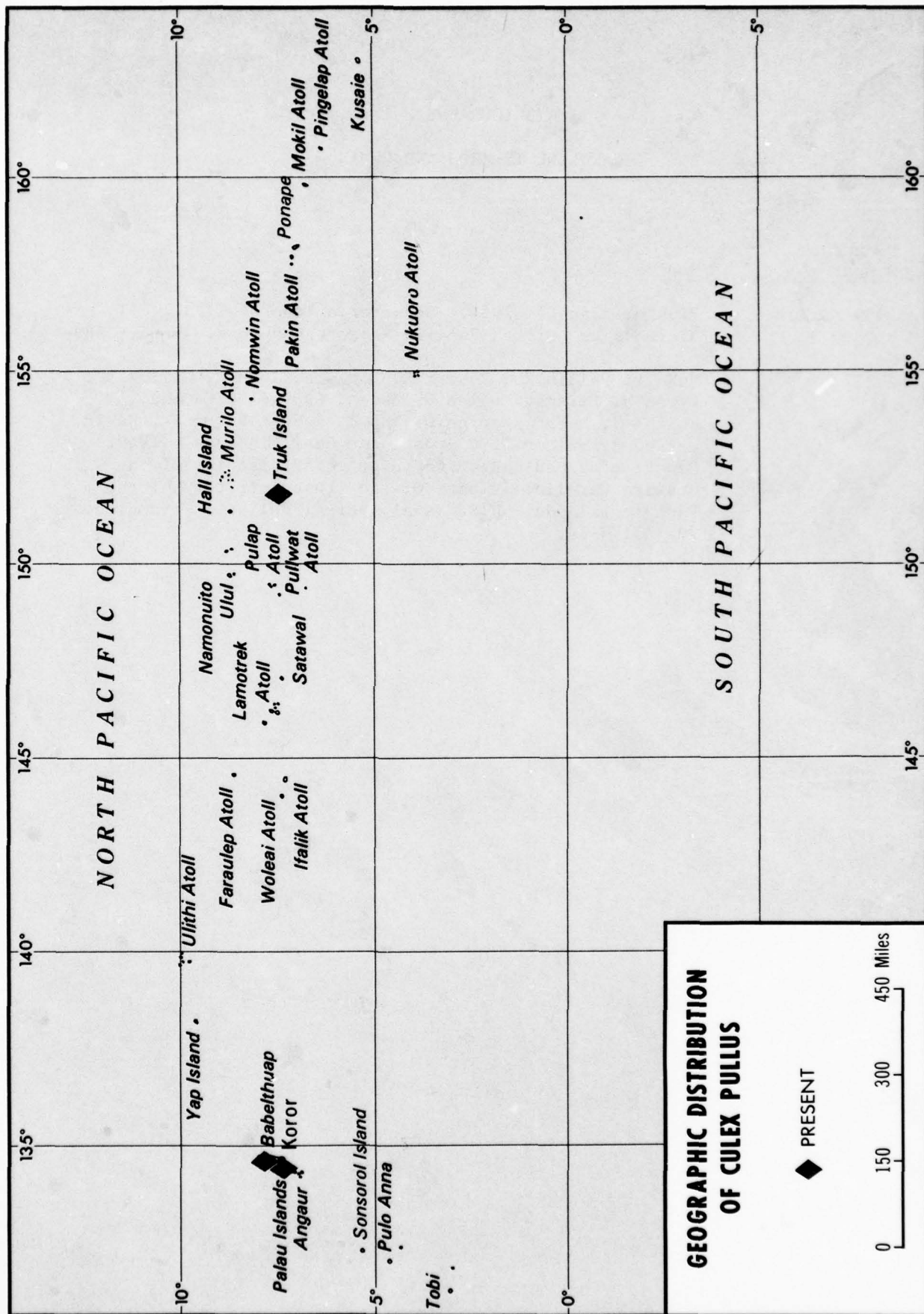












BIBLIOGRAPHY

CAROLINE ISLANDS AND HUMAN

Document
Number

Source

2039

Pipkin, Alan C. 1954. Wuchereria bancrofti in
Micronesia. Eighth Pacific Science Congress. V6-A: 589-603.

2113

McNair, Philip K., Robert R. Garison, John H. Gilip Jr.,
Byron M. Briggs, Lucien G. Estes, George M. Lamaze,
Roland J. Hurst, George G. Appel, Robert V. Davis, David
Delapena, Walter P. Claypool and Carl N. Hayes. 1949.
Report of a medical survey of the YAP district of the
Western Caroline Islands of the Trust Territory of the
Pacific Islands. U.S. Naval Medical Bulletin - Supplement.
22 (4): 5-19.

BIBLIOGRAPHY

CAROLINE ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2039	Pipkin, Alan C. 1954. <u>Wuchereria bancrofti</u> in Micronesia. Eighth Pacific Science Congress. V6-A: 589-603.
2113	McNair, Philip K., Robert R. Garison, John H. Gilip Jr., Byron M. Briggs, Lucien G. Estes, George M. Lamaze, Roland J. Hurst, George G. Appel, Robert V. Davis, David Delapena, Walter P. Claypool and Carl N. Hayes. 1949. Report of a medical survey of the YAP district of the Western Caroline Islands of the Trust Territory of the Pacific Islands. U.S. Naval Medical Bulletin - Supplement. 22 (4): 5-19.

Q. Tubuai Islands

1. Human Data

There is no indication of mosquito control measures being introduced but treatment was started in 1962. The geographic distribution of the highest prevalence rates can be found in Map 176. The most recent prevalence rates are presented in Table 25.

2. Mosquito Data

There is no information on the mosquito population in the Disease Information System.

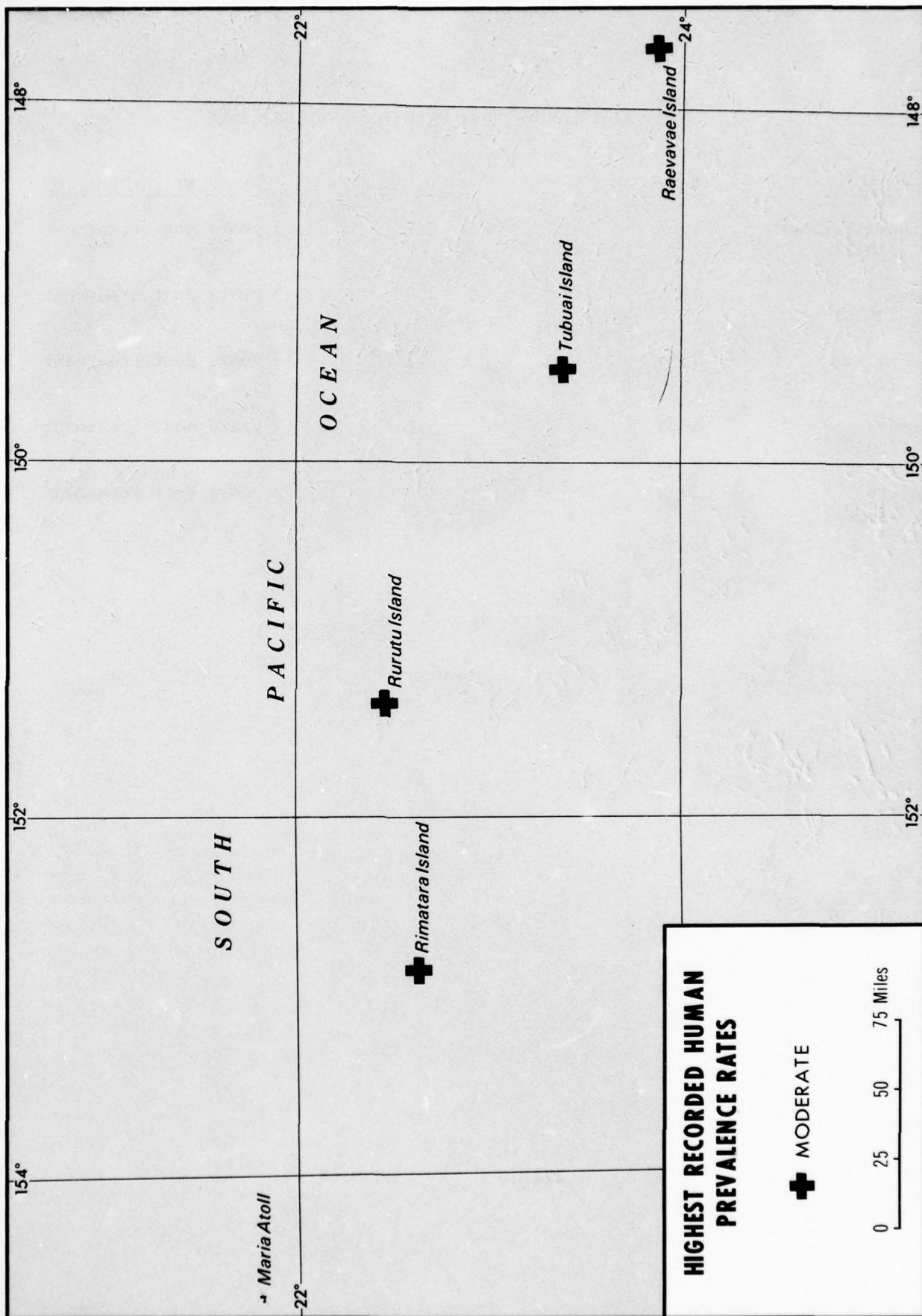


Table 25

TUBUAI ISLANDS- MOST RECENT PREVALENCE RATED

<u>LOCATION</u>	<u>DATE</u>	<u>PREVALENCE</u>	<u>TREATMENT INFORMATION</u>
Tubuai Islands (2042)	1967	2.7%	5 years post treatment
Tubuai (2038)	1965	1.8	3 years post treatment
Raevavae (2038)	1965	2.1	3 years post treatment
Rimatara (2038)	1965	5.2	3 years post treatment
Rukutu (2038)	1964	4.0	2 years post treatment

BIBLIOGRAPHY

TUBUAI ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2042	World Health Organization Regional Office for the Western Pacific and the South Pacific Commission. 1968. Second WHO/SPC joint seminar on filariasis. Final Report. Wld. Health. Org. Monogr. Ser. #WPR/350/68: 1-44.
2064	Beye, H. K., J. F. Kessel, J. Heuls, G. Thooris and Ben Bambridge. 1963. Nouvelles recherches sur l'importance des manifestations cliniques, et la lutte contre la filariose a Tahiti, Oceanie Francaise. Bull. Soc. Path Exot. 46(1): 144-163.
2138	Unknown, 1969. Raw data - Tahiti and Tubuai Islands - filariasis. Unpublished. 1-24.

R. Mariana Islands

1. Human data

The only observation on human disease in the Disease Information System notes that no cases of human filariasis were reported on the island of Guam during 1970 and 1971.

2. Mosquito Data

Information on the role and the bionomics of the various mosquito species can be found in Table 26. All information is for the island of Guam.

Table 26

MARIANA ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedeomyia catacticta</i>					source: 2078.
<i>Aedes aegypti</i>	dengue vector. (2078)		artificial containers. (2078)		additional source: 2111.
<i>Aedes albopictus</i>	dengue vector. (2078)	apparently prefers high organic content water. (2055)	shares same breeding sites with <i>Aedes guamensis</i> . natural containers -- tree holes, coconut shells, hollow logs, rock holes, bamboo, palm bracts, snail shells. artificial containers -- cans, barrels, bowls, pots, etc. in houses, tires. (2055) artificial containers, pandanus axils, tire depressions, tree holes. (2078)	rarely observed biting human bait. (2055)	replaced <i>Aedes aegypti</i> after its elimination. (2078) has apparently invaded most of Guam. (2055)
<i>Aedes dubasi</i>					source: 2078.
<i>Aedes guamensis</i>		apparently prefers high organic content water. (2055)	shares same breeding sites with <i>Aedes albopictus</i> . natural containers -- tree holes, coconut shells, hollow logs, rock holes, bamboo, palm bracts, snail shells. artificial containers -- cans, barrels, 225	rarely observed biting human bait. (2055)	

Table 26 cont.

MARIANA ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes guamensis</i> (cont.)			bowls, pots, etc. in houses, tires. (2056) artificial containers, sluggish streams. (2078)		
<i>Aedes hensili</i>					source: 2078.
<i>Aedes moenensis</i>		grassy ditch. (2039)			
<i>Aedes pandani</i>			artificial containers, grassy ditch, pandanus axils, standing water, tire depressions, tree holes. (2078) only in pandanus leaf axils. (211)		
<i>Aedes pseudoscutellaris</i>			larvae collected from water filled tree hollow and coconut shells. (211)		
<i>Aedes rotanus</i>			grassy ditch, sluggish stream. (2078)		
<i>Aedes saipanensis</i>					source: 2078.
			226		

Table 26 cont.

MARIANA ISLANDS - MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes vexans</i>			artificial containers, carabao wallow, grassy ditch, sluggish stream, tire depressions. (2078)		
<i>Anopheles baezai</i>			carabao wallow. (2078)		
<i>Anopheles lesteri</i>			carabao wallow. (2078)		
<i>Anopheles sinensis</i>	primarily malaria vector. (2078)		carabao wallow. (2078)		
<i>Anopheles subpictus</i>			carabao wallow, hoof prints. (2078)		
<i>Anopheles tessellatus</i>	malaria vector in other areas. (2078)		carabao wallow. (2078)		
<i>Anopheles vagus</i>	variable malarial vector potential. (2078)		carabao wallow and hoof prints. (2078)		

Table 26 cont.

MARIANA ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex fatigans</i>			hog wallow. (2111) artificial containers, carabao wallow, grassy ditch, sluggish stream, standing water, tire depressions. (2078)		
<i>Culex fuscus</i>			artificial containers, carabao wallow, grassy ditch, sluggish stream, standing water. (2078)		
<i>Culex fuscocephalus</i>			artificial containers, carabao wallow, grassy ditch, sluggish stream, standing water, hoof prints. (2078)		
<i>Culex hutchinsoni</i>					source: 2078.
<i>Culex litoralis</i>			carabao wallow, standing water. (2078)		
<i>Culex papuensis</i>					source: 2078.
			228		

Table 26 cont.

MARIANA ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Culex pseudovishnui</i>					source: 2078.
<i>Culex sitiens</i>			artificial containers, carabao wallow, grassy ditch, standing water. (2078)		
<i>Culex tritaeniorhynchus</i>	Japanese B encephalitis vector. (2078)		artificial containers, carabao wallow, grassy ditch, sluggish stream, standing water, tire depressions. (2078)		
<i>Culex vagans</i>					source: 2078.

BIBLIOGRAPHY

MARIANA ISLANDS AND HUMAN

Document
Number

Source

2078

Reisen, William K., John P. Burns and Ruben G. Basio.
1972. Mosquito survey of Guam, Marianas Islands with
notes on the vector borne disease potential. Jour.
Med. Ent. 9 (4): 319-324.

BIBLIOGRAPHY

MARIANA ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2055	Rozeboom, L. E., and J. R. Bridges, 1972. Relative population densities of <u>Aedes albopictus</u> and <u>A.</u> <u>Guamensis</u> on Guam. Bull. Wld. Helth. Org. 46: 477-483.
2078	Reisen, William K., John P. Burns and Ruben G. Basio. 1972. Mosquito survey of Guam, Marianas Islands with notes on the vector borne disease potential. Jour. Med. Ent. 9 (4): 319-324.
2111	Swezey, O. H. 1940. Culicidae of Guam. Bernice P. Bishop Museum - Bulletin. #172: 199-200.

S. Marshall Islands

1. Human data

The only observation in the Disease Information System is for Arno in 1950 in which no obvious disease was present.

2. Mosquito Data

Information on the role and the bionomics of the 3 mosquito species is presented in Table 27. All observations were from the island of Arno.

Table 27

MARSHALL ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes aegypti</i>			concrete cisterns and other drinking water receptacles. (2120)		larvae are bottom feeders. (2120)
<i>Aedes marshallensis</i>			tree holes and coconut shells. (2120)		
<i>Culex fatigans</i>					absent. (2120)

BIBLIOGRAPHY

MARSHALL ISLANDS AND HUMAN

Document
Number

Source

2120

Usinger, R. L. and Ira La Rivers. 1953. Insect life
of Arno. Excerpts. Atoll Research Bulletin. #15-16.

BIBLIOGRAPHY
MARSHALL ISLANDS AND MOSQUITO

Document
Number

Source

2120

Usinger, R. L. and Ira La Rivers. 1953. Insect life of Arno. Excerpts. Atoll Research Bulletin. #15-16.

T. Gilbert Islands

1. Human Data

Reportedly, only periodic W. bancrofti is present in this area. Transmission is by Culex pipiens fatigans.

2. Mosquito Data

Information on the role and the bionomics of the various mosquito species is presented in Table 23.

Table 28

GILBERT ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes aegypti</i>					source: 2080.
<i>Aedes marshallensis</i>			husks of coconuts. (2080)	shady area, daytime pests. (2080)	common everywhere on Tarawa. (2080)
<i>Aedes vexans</i>			coarse taro (babai) pits. (2080)		
<i>Culex annulirostris</i>			plentiful in coarse taro cultivating pits holding fresh to brackish rain water. pH = 7.2 to 8.0, mean = 7.4. water temperature = 28°C (2080)	bothersome at night. (2080)	
<i>Culex fatigans</i>					source: 2080.

BIBLIOGRAPHY

GILBERT ISLANDS AND HUMAN

<u>Document Number</u>	<u>Source</u>
2030	Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific Islands. South Pacific Commission Technical Paper. #125: 1-96.
2089	Brunwin, A. D. 1909. Some aspects of filariasis in Fiji. Jour. Trop. Med. Hyg. 12 (24): 365-370.
2091	Schlosser, Ralph J. 1945. Observations on the incidence of <u>Wuchereria bancrofti</u> larvae in the native population of the Solomon Islands area. American Journal of Tropical Medicine. 25: 493-495.

BIBLIOGRAPHY

GILBERT ISLANDS AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2080	Laird, Marshall. 1955. Notes on the mosquitoes of the Gilbert, Ellice and Tokelau Islands, and on filariasis in the latter group. Bull. Ent. Res. 46: 291-300.
2091	Schlosser, Ralph J. 1945. Observations on the incidence of <u>Wuchereria bancrofti</u> larvae in the native population of the Solomon Islands area. American Journal of Tropical Medicine. 25: 493-495.

U. Nauru Island

1. Human Data

The only observation in the Disease Information System on this island was a survey (1927-1932) in which the prevalence rate, as demonstrated by the thick film smear, was 36.1%, periodic type.

2. Mosquito Data

Limited information on the mosquitoes is presented in Table 29.

Table 29

NAURU ISLAND — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes argenteus</i>					source: 2115.
<i>Culex fatigans</i>	filarial embryos in crushed specimens suggests vector capability. (2115)				
<i>Stegomyia fasciata</i>					source: 2115.

BIBLIOGRAPHY

NAURU ISLAND AND HUMAN

Document
Number

Source

2115

Grant, Alan M. B. 1933. Medical survey of the island of Nauru. Med. Jour. Aust. 1: 113-118.

BIBLIOGRAPHY
NAURU ISLAND AND MOSQUITO

<u>Document Number</u>	<u>Source</u>
2115	Grant, Alan M. B. 1933. Medical survey of the island of Nauru. Med. Jour. Aust. 1: 113-118.

V. Ocean Island

1. Human Data

The only observation in the Disease Information System was made in 1950; Banabans with periodic type filariasis were found not to have elephantiasis and chyluria was very rare.

2. Mosquito Data

Limited information on the mosquitoes is presented in Table 30.

Table 30

OCEAN ISLANDS — MOSQUITO DATA

	ROLE	HABITAT	BREEDING	BITING	REMARKS
<i>Aedes aegypti</i>			wells and caverns in porous rock. (2036)		
<i>Aedes scutellaris</i>					absent. (2036)
<i>Culex fatigans</i>			wells and caverns in porous rock. (2036)		

BIBLIOGRAPHY

OCEAN ISLAND AND HUMAN

<u>Document Number</u>	<u>Source</u>
2036	Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326.

BIBLIOGRAPHY

OCEAN ISLAND AND MOSQUITO

Document
Number

Source

2036

Manson-Bahr, Philip and W. J. Muggleton. 1952.
Further research on filariasis in Fiji. Trans. Roy.
Soc. Trop. Med. Hyg. 46 (3): 301-326.

SELECTED BIBLIOGRAPHY

PART III

	Document Number
Advisory Team. 1973. Quarterly report of the WHO intercountry filariasis advisory team. Third quarter, 1973. Unpublished. 1-2.	2134
Advisory Team. 1974. Report on a field trip to the Ellice Islands by the WHO intercountry filariasis advisory team (WPRO-2201). February and March 1974. Unpublished. 1-6.	2135
Backhouse, T. C. and A. R. Woodhill. 1956. Further studies on the hospitality of some <u>Scutellaris</u> group and other mosquitoes towards <u>Wuchereria bancrofti</u> from New Caledonia. South Pacific Commission Technical Paper. #17. 1-4.	2048
Basu, B. C. and S. Sundar Rao. 1939. Studies on filariasis transmission. Indian Jour. Med. Res. 27 (1): 233-249.	2094
Beye, H. K., S. A. Edgar, R. Mille, J. F. Kessel and Ben Bambridge. 1952. Preliminary observations on the prevalence, clinical manifestations and control of filariasis in the Society Islands. Amer. Jour. Trop. Med. Hyg. 1 (4): 637-661.	2035
Beye, H. K., J. F. Kessel, J. Heuls, G. Thooris and Ben Bambridge. 1963. Nouvelles recherches sur l'importance, les manifestations cliniques, et la lutte contre la filariose a Tahiti, Oceanie Francaise. Bull. Soc. Path. Exot. 46 (1): 144-163.	2064
Beye, Henry K. and Joan Gurian. 1960. Epidemiology and dynamics of transmission of <u>Wuchereria bancrofti</u> and <u>Brugia malayi</u> . Indian Journal of Malariology. 14 (4): 415-440.	2159
Bird, G. W. G. and K. K. Menon. 1961. Survival of <u>microfilaria bancrofti</u> in stored blood. Lancet. #7204: 721.	2029
Bonnet, David D. and Herald Chapman. 1958. Larval habitats of <u>Aedes polynesiensis</u> Marks in Tahiti and methods of control. Amer. Jour. Trop. Med. Hyg. 7: 512-518	2049

- Bonnet, David D., John F. Kessel, Jacques Kerrest and Herald Chapman. 1956. Mosquito collections and dissections for evaluating transmission of filariasis in Polynesia (Tahiti). Amer. Jour. Trop. Med. Hyg. 5: 1093-1102. 2060
- Brunwin, A. D. 1909. Some aspects of filariasis in Fiji. Jour. Trop. Med. Hyg. 12 (24): 365-370. 2089
- Bryan, Joan H. and B. A. Southgate. 1973. Investigation of the transmission potential of ultra low level Wuchereria bancrofti microfilaria carriers after diethylcarbamazine treatment. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/73.116: 1-11. 2024
- Brygoo, E. R. and J. Brunhes. 1970. Report of a survey on lymphatic (bancroftian) filariasis in Reunion carried out in January/February 1970. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/70.89: 1-48. 2027
- Burhans, Robert A., John D. Camp, Hugh R. Butt and Richard W. Cragg. 1944. Lymphangitis of suspected filaria origin. Preliminary report concerning treatment. U.S. Naval Medical Bulletin. 42: 336-340. 2090
- Burnett, G. F. 1960. Filariasis research in Fiji 1957-1959. Unpublished. 1-159. 2046
- Burnett, G. F. and J. U. Mataika. 1961. Mass administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis. Trans. Roy. Soc. Trop. Med. Hyg. 55 (2): 178-187. 2061
- Burnett, G. F. and J. U. Mataika. 1964. Mass administration of diethylcarbamazine citrate in preventing transmission of aperiodic human filariasis. II. Results of a blood survey made four years after drug administration. Trans. Roy. Soc. Trop. Med. Hyg. 58 (6): 545-551. 2062
- Byrd, Elon E. and Lyle S. St. Amant. 1959. Studies on the epidemiology of filariasis on Central and South Pacific islands. South Pacific Commission Technical Paper. #125. 1-96. 2030

- Desowitz, Robert S. and Steven J. Berman. 1973. 2088
Epidemiological investigations on filariasis
in the South Pacific and Indonesia. Report
on visits made from 18 July to 9 September
1973. Unpublished. WHO consultants. 1-48.
- Desowitz, Robert S. and James C. Hitchcock. 1973 2151
Microfilaremia in hyperendemic bancroftian
filariasis. Unpublished. 1-10.
- Dickson, James G., Robert W. Huntington Jr. and 2085
Samuel Eichold. 1943. Filariasis in defense
force, Samoan group. U.S. Naval Medical Bulletin.
41 (5): 1240-1251.
- Edwards, F. W. 1933. Mycetophilidae, culicidae, and 2112
chironomidae and additional records of simuliidae,
from the Marquesas Islands. Bernice P. Bishop
Museum - Bulletin. #114: 85-92.
- Englehorn, Theodore D. and William E. Wellman. 1945 2096
Filariasis in soldiers on an island in the
South Pacific. Amer. Jour. Med. Sci. 209 (2):
141-152.
- Esera, I. and Tin Maung Maung. 1970. Filariasis 2129
control project. Western Samoa. Annual report
1970. Unpublished. 1-28.
- Faine, S. and C. E. Hercus. 1951. Infections in 2047
Raratonga, Cook Islands. Trans. Roy. Soc. Trop.
Med. Hyg. 45 (3): 345-346.
- Flynn, Philip D. 1944. Filariasis suspects. Review 2087
of cases. U.S. Naval Medical Bulletin. 42 (5):
1075-1079.
- Galang, Claudia A. 1973. Experimental infection of 2054
Aedes aegypti with Wuchereria bancrofti. Wld.
Hlth. Org. Monogr. Ser. #WHO/WBC/73.469 & WHO/
FIL/73.118: 1-3.
- Galliard, H., R. Mille and W. A. Robinson. 1949 2071
Recherches sur la filariose a Tahiti. Bull Soc.
Path. Exot. 42: 174-178.
- Goodman, Abel A., Emmanuel M. Weinberger, Stuart W. 2084
Lippincott, Alexander Marble and Willard H.
Wright. 1945. Studies of filariasis in soldiers
evacuated from the South Pacific. Ann. Intern.
Med. 23: 823-835.

- Grant, Alan M. B. 1933. Medical survey of the island of Nauru. Med. Jour. Aust. 1: 113-118. 2115
- Gubler, Duane J. 1970. Competitive displacement of Aedes (Stegomyia) polynesiensis Marks by Aedes (Stegomyia) albopictus Skuse in laboratory populations. Jour. Med. Ent. 7 (2): 229-235. 2067
- Gubler, Duane J. 1970. Induced sterility in Aedes (Stegomyia) polynesiensis Marks by cross insemination with Aedes (Stegomyia) albopictus Skuse. Jour. Med. Ent. 7 (1): 65-70. 2070
- Hairston, Nelson G. and Botha De Meillon. 1968. On the inefficiency of transmission of Wuchereria bancrofti from mosquito to human host. Wld. Hlth. Org. 38: 935-941. 2158
- Haviland, J. M. 1944. Recent experiences with filariasis. Northwest Medicine. 43 (12): 371-376. 2093
- Hitchcock, J. C. Jr. 1971. Transmission of sub-periodic filariasis in Tonga by Aedes oceanicus Belkins. Trans. Roy. Soc. Trop. Med. Hyg. 65: 408-409. 2022
- Hitchcock, J. C. 1970. Progress report - His Majesty King Taufa'ahau Tupou IV Kingdom of Tonga. Unpublished. 1-3. 2052
- Hitchcock, J. C. 1974. Filariasis surveys in the Kingdom of Tonga. Unpublished. 1-6. 2136
- Hitchcock, James C. Jr. 1969. UCLA mosquito studies in Tonga - 1968. Proceedings of the 56th Annual Meeting of the New Jersey Mosquito Extermination Association. 116-122. 2007
- Hitchcock, James C. Jr. 1970. Evaluation of filariasis mosquito surveys based on the physiological age of the vector. Jour. Parasit. 56 (4): 149. 2014
- Hitchcock, J. C. 1974. Filariasis surveys in the Kingdom of Tonga. Unpublished. 1-6. 2153
- Hocking, Brian. 1967. Use of repellents and attractants in filariasis control. Bull. Wld. Hlth. Org. 37: 323-327. 2082

- Hodge, Ian G., Eric Denhoff and Joseph B. Vander Veer. 1945. Early filariasis (bancrofti) in American soldiers. Amer. Jour. Med. Sci. 210 207-223. 2077
- I. R. M. L. M. 1973. Controle des porteurs de microfilaries avant recuz un traitement de no- tezine. Raw data. Unpublished. 1-23. 2137
- Ingram, Robert L. 1954. Study of the bionomics of Aedes (Stegomyia) polynesiensis Marks under laboratory conditions. American Journal of Hygiene. 60: 169-185. 2028
- Institut de Recherches Medicales "Louis Malarde." 1973 Etude statistiques de l'enquete clinique et biolo- gique effectuees dans les zones pilotes de Paea (KM 24 A 28), de Hitiaa (KM 36) de Tiarei (KM 22), de Faaone (KM 50) en Septembre - Octobre 1973. Raw data. Unpublished. 1-4. 2144
- Institut de Recherches Medicales de la Polynesie Fran- caise. 1957. Summary of annual report 1957. Unpublished. 1-5. 2140
- Iyengar, M. O. T. 1958. Investigation on filariasis in Niue. South Pacific Commission Technical Paper. #30. 1-10. 2053
- Iyengar, M. O. T. 1955. Filariasis investigations in New Caledonia. South Pacific Commission Quarterly Bulletin. 27 & 34. 2104
- Iyengar, M. O. T. 1957. Report on an investigation of filariasis in the Cook Islands. South Pacific Commission Technical Paper. #21. 1-13. 2121
- Iyengar, M. O. T. and M. A. V. Menon. 1956. Studies on filariasis in New Caledonia. South Pacific Com- mission Technical Paper. #15. 1-3. 2081
- Jachowski, Leo A. Jr. 1954. Filariasis in American Samoa. V. Bionomics of the principal vector, Aedes polynesiensis Marks. American Journal of Hygiene. 60: 186-203. 2013
- Jachowski, Leo A. Jr. 1957. Filariasis in American Samoa. VI. Survey of Swain's Island. Proc. Helminth. Soc. Wash. 24 (1): 26-29. 2041

- Jachowski, Leo A. Jr. and Gilbert F. Otto. 1952. 2011
 Filariasis in American Samoa. II. Evidence of
 Transmission outside of villages. Amer. Jour.
 Trop. Med. Hyg. 1 (4): 662-670.
- Jachowski, Leo A. Jr. and Gilbert F. Otto. 1955. 2012
 Filariasis in American Samoa. IV. Prevalence of
 microfilaremia in the human population. American
 Journal of Hygiene. 61: 334-348.
- Jachowski, Leo A. Jr., Gilbert F. Otto and James D. 2040
 Wharton. 1951. Filariasis in American Samoa.
 I. Loss of microfilaria in the absence of con-
 tinued reinfection. Proc. Helminth. Soc. Wash.
 18 (1): 25-28.
- Jordan, P. 1959. Note on the effect of a blood meal 2074
 on infective larvae of Wuchereria bancrofti in
Culex fatigans. Trans. Roy. Soc. Trop. Med. Hyg.
 53 (2): 148-150.
- Kartman, Leo. 1954. Suggestions concerning an index of 2059
 experimental filaria infection in mosquitoes.
 Amer. Jour. Trop. Med. Hyg. 3: 329-337.
- Kessel, John F. 1971. Review of the filariasis con- 2026
 trol programme in Tahiti from November 1967 to
 January 1968. Bull. Wld. Hlth. Org. 44:
 783-794.
- Kessel, John F. 1957. Effective programme for the con- 2057
 trol of filariasis in Tahiti. Bull. Wld. Hlth.
 Org. 16: 633-664.
- Kessel, John F. and Emile Massal. 1962. Control of 2038
 bancroftian filariasis in the Pacific. Bull.
 Wld. Hlth. Org. 27: 543-554.
- Kessel, John F., Nofo Siliga, Harry Tompkins Jr. and 2018
 Kenneth Jones. 1969. Periodic mass treatment
 with diethylcarbamazine for control of filariasis
 in American Samoa. Unpublished. 1-26.
- Knott, James. 1935. Periodicity of the microfilaria 2105
 of Wuchereria bancrofti. Preliminary report of
 some injection experiments. Trans. Roy. Soc.
 Trop. Med. Hyg. 29 (1): 59-64.
- Lacour, M. and J. Rageau. 1957. Enquete epidemiologique 2045
 et entomologique sur la filariose de bancroft en
 Nouvelle Calédonie et dependances. South Pacific
 Commission Technical Paper. #110. 1-25.

- Lagraulet, J., M. Barsinas and G. Fagneaux. 1972. 2069
Heterogeneite de la repartition des micro-
filaires dans le sang peripherique chez les
malades atteints de filariose de bancroft et
aperçu general sur la filariose aux Marquises.
Bull. Soc. Path. Exot. 65 (5): 698-703.
- Lagraulet, J., M. Barsinas, G. Fagneaux and M. Teahui. 2043
1973. Etat actuel de la filariose aux Mar-
quises et differents aspects epidemiologiques.
Bull. Soc. Path. Exot. 66: 139-155.
- Lagraulet, J. and P. Bonnin. 1971. Filariose lym- 2083
phatique a Millicolo (Nouvelles Hebrides,
enquête preliminaire). Bull. Soc. Path,
Exot. #2: 229-231.
- Laigret, Jacques, John F. Kessel, Louis Malarde, Ben 2066
Bambridge and Herard Adams. 1965. Lutte
contre la filariose lymphatique aperiodique en
Polynesie Francaise. Bull. Soc. Path. Exot.
58 (5): 895-916.
- Laird, Marshall. 1955. Notes on the mosquitos of 2080
the Gilbert, Ellice and Tokelau Islands, and
on filariasis in the latter group. Bull. Ent.
Res. 46: 291-300.
- Laird, Marshall. 1954. Mosquitos of Aitutaki, 2117
Southern Cook Islands. Bull. Ent. Res. 45:
423-427.
- Lambert, S. M. 1926. Health survey of the Cook 2116
Islands, with special reference to hookworm
disease. International Health Board of the
Rockefeller Foundation. 27-40.
- Lever, J. A. W. 1943. Some common mosquitoes of 2119
the Suva area. Agricultural Journal of Fiji.
14: 101-102.
- Lowrie, Robert C. Jr. 1973. Effect of competition 2079
between larvae of Aedes (S.) albopictus Skuse
and A. (S.) polynesiensis Marks. Jour. Med.
Ent. 10 (L): 23-30.
- Mahoney, Louis E. Jr. and Patrick Aiu. 1970 2017
Filariasis in Samoan immigrants to the United
States. Amer. Jour. Trop. Med. Hyg. 19 (4):
629-631.

- Mahoney, Louis E. and John F. Kessel. 1971. Treatment failure in filariasis mass treatment programmes. Bull. Wld. Hlth. Org. 45: 35-42. 2016
- Malarde, Louis, 1965. Faculte mixte de Medecine et de pharmacie de rennes section medicine. Unpublished. 2-41. 2142
- Manson-Bahr, Philip. 1952. Action of hetrazan in Pacific filariasis. Jour. Trop. Med. Hyg. 55: 169-173. 2102
- Manson-Bahr, Philip and W. J. Muggleton. 1952. Further research on filariasis in Fiji. Trans. Roy. Soc. Trop. Med. Hyg. 46 (3): 301-326. 2036
- March, H. N., Jacques Laigret, John F. Kessel and Ben Bambridge. 1960. Reduction in the prevalence of clinical filariasis in Tahiti following adoption of a control program. American Journal of Tropical Medicine. 9: 180-184. 2037
- Mataika, J. U., B. C. Dando and F. N. MacNamara. 1970. Filariasis and arbovirus survey. Northern Fiji. 1968-1969. Report to the director of medical services, Fiji. Unpublished. 1-79. 2073
- Mataika, J. U. and V. Cagimaivei. 1974. Country report. Fiji Islands. Unpublished. 1-14. 2152
- Mataika, J. U., B. C. Dando, G. F. S. Spears and F. N. MacNamara. 1971. Mosquito borne infections in Fiji. I. Filariasis in Northern Fiji: epidemiological evidence regarding factors influencing the prevalence of microfilaraemia of Wuchereria bancrofti infections. Jour. Hyg. Cambridge. 69: 273-286. 2004
- Mataika, J. U., B. C. Dando, G. F. S. Spears and F. N. MacNamara. 1971. Mosquito borne infections in Fiji. III. Filariasis in Northern Fiji: epidemiological evidence regarding the mechanisms of pathogenesis. Jour. Hyg. Cambridge. 69: 297-307. 2005
- Maung, Tin Maung. 1974. Filariasis control by the application of mass drug administration in Western Samoa, Ellice Islands and Niue. Wld. Hlth. Org. Monogr. Ser. #WPR/FIL/11: 1-6. 2125

- Maung, Tin Maung. 1969. Report on the visit to Ellice Island. (19 June to 27 June 1969). Unpublished. 1-13. 2146
- Maung, Tin Maung and Lanu Penaia. 1971. Filariasis control project. Unpublished. 1-19. 2127
- Maung, Tin Maung and Lanu Penaia. 1971. Filariasis control project. Western Samoa. First quarterly report 1971. Unpublished. 1-18. 2128
- McCarthy, D. D. 1956. II. Pseudo periodicity in the Pacific variety of Wuchereria bancrofti: a study of fluctuations in the density of microfilariae in the peripheral blood of Samoans. Trans. Roy. Soc. Trop. Med. Hyg. 50 (1): 66-71. 2009
- McCarthy, D. D. and N. Fitzgerald. 1956. I. Habit, habitat and hyperfilaria in the epidemiology of filariasis in Western Samoa. Trans. Roy. Soc. Trop. Med. Hyg. 50 (1): 58-65. 2008
- McCarthy, D. D. and N. Fitzgerald. 1955. Researches in Western Samoa. III. Observations of filariasis. Trans. Roy. Soc. Trop. Med. Hyg. 49 (1): 82-89. 2010
- McKenzie, A. 1925. Observations on filariasis, yaws, and intestinal helminthic infections in the Cook Islands with notes on the breeding habits of Stegomyia pseudoscutellaris. Trans. Roy. Soc. Trop. Med. Hyg. 19: 138-149. 2097
- McNair, Philip K., Robert Garison, John H. Gilip Jr., Byron M. Briggs, Lucien G. Estes, George M. Lamaze, Roland J. Hurst, George G. Appel, Robert V. Davis, David Delapena, Walter P. Claypool and Carl N. Hayes. 1949. Report of a medical survey of the YAP district of the Western Caroline Islands of the Trust Territory of the Pacific Islands. U.S. Naval Medical Bulletin - Supplement. 22 (4): 5-19. 2113
- Meillon, Botha de, B. Grab and Anthony Sebastian. 1967. Evaluation of Wuchereria bancrofti infection in Culex pipiens fatigans in Rangoon, Burma. Bull. Wld. Hlth. Org. 36: 91-100. 2149
- Meillon, Both de, Shigeyo Hayashi and Anthony Sebastian. 1967. Infection and reinfection of Culex pipiens fatigans with Wuchereria bancrofti and the loss of mature larvae in blood feeding. Bull. Wld. Hlth. Org. 36: 81-90. 2150

- Menon, T. Bhaskara and B. Ramamurti. 1941. Behavior of the infective larvae of Wuchereria bancrofti with special reference to their mode of escape and penetration of skin. Indian Jour. Med. Res. 29 (2): 393-401. 2092
- Mills, A. R. 1954. Health survey of Futuna Island. South Pacific Commission Quarterly Bulletin. 26-28. 2106
- Muang, Tin Maung. 1966. Filariasis control project, Western Samoa. Report for period after arrival at duty station to end of 1966. (From 7 December 1966 to 31 December 1966). Unpublished. 1-8. 2132
- Muang, Tin Muang and L. Penaia. 1971. Filariasis control project. Western Samoa. Third quarterly report 1971. Unpublished. 1-14. 2131
- Murray, William D. 1948. Filariasis studies in American Samoa. U.S. Naval Medical Bulletin. 48 (2): 327-341. 2051
- Mataika, J. U. and V. Cagimaivei. 1974. Country report, Fiji Islands. Wld. Hlth. Org. Monogr. Ser. 1-13. 2124
- Nelson S. and J. M. Cruikshank. 1956. Filariasis in Fiji. Abstracts from a report. Unpublished. 1-4. 2031
- Norman, Taylor W. and W. H. Rees. 1964. Health survey in the New Hebrides. South Pacific Commission Technical Paper. #143. 1-38. 2098
- O'Connor, Francis W. 1922. Some results of medical researches in the Western Pacific. Trans. Roy. Soc. Trop. Med. Hyg. 16 (1&2): 28-56. 2095
- Otto, Gilbert F. and Leo A. Jachowski Jr. 1955. Problems in the epidemiology and control of filariasis. Wld. Hlth. Org. Monogr. Ser. #WHO/FIL/9: 1-10. 2032
- Partono, Felix, John H. Cross, Borahima, J. C. Lien and Sri Oemijati. 1973. Malaria and filariasis in a transmigration village eight and twenty-two months after establishment. S. E. Asian Jour. Trop. Med. Publ. Hlth. 4 (4): 484-486. 2044

- Perry, William J. 1950. Mosquitoes and mosquito borne diseases on New Caledonia, an historic account: 1885-1946. American Journal of Tropical Medicine. 30: 103-113. 2025
- Perry, William J. 1949. Mosquitoes and mosquito borne diseases of the Treasury Islands (British Solomon Islands). American Journal of Tropical Medicine. 29: 747-758. 2058
- Perry, William J. 1950. Principal larval and adult habitats of Anopheles farauti lav. in the British Solomon Islands. Mosquito News. 10 (3): 117-126. 2109
- Pichon, Gaston. 1974. Quantitative aspects in filariasis. 1. Parasitic reduction in the vector and the possible influence on regulation of parasite populations. Unpublished. 1-5. 2133
- Pipkin, Alan C. 1954. Wuchereria bancrofti in Micronesia. Eighth Pacific Science Congress. V6-A: 589-603. 2039
- Pratt, Ivan and Walter L. Newton. 1946. Migration of infective larvae of Wuchereria bancrofti within the mosquito host and their rate of escape under laboratory conditions. Jour. Parasit. 32: 272-280. 2123
- Primrose, A. 1903. Filariasis in man cured by removal of the adult worms in an operation for lymph scrotum. Br. Med. Jour. 2: 1262-1265. 2108
- Rageau, Jean. 1959. Enquete sur la filariose a Wallis. Institut Francais, d'Oceanie. 1-37. 2122
- Ramalingam, Shivaji. 1968. Epidemiology of filarial transmission in Samoa and Tonga. Ann. Trop. Med. Parasit. 62: 305-323. 2020
- Ramalingam, Shivaji and John N. Belkin. 1964. Vectors of sub-periodic bancroftian filariasis in the Samoa Tonga area. Nature. London. 201: 105-106. 2015
- Rao, S. Sundar. 1933. Duration of the life of the embryos of Wuchereria bancrofti in the human system. Indian Medical Gazette. 68: 3-6. 2114

- Reisen, William K., John P. Burns and Ruben G. Basio. 2078
1972. Mosquito survey of Guam, Marianas Islands
with notes on the vector borne disease potential.
Jour. Med. Ent. 9 (4): 319-324.
- Rosen, Leon. 1955. Observations on the epidemiology 2033
of human filariasis in French Oceania. American
Journal of Hygiene. 61 (2): 219-248.
- Rosen, Leon. 1954. Human filariasis in the Marquesas 2034
Islands. Amer. Jour. Trop. Med. Hyg. 3 (4):
742-745.
- Rozeboom, L. E. and J. R. Bridges. 1972. Relative 2055
population densities of Aedes albopictus and A.
guamensis on Guam. Bull. Wld. Hlth. Org. 46:
477-483.
- Rozeboom, Lloyd E. 1971. Relative densities of freely 2063
breeding populations of Aedes (S.) polynesiensis
Marks and A. (S.) albopictus Skuse. Large case
experiment. Amer. Jour. Trop. Med. Hyg. 20 (2):
356-362.
- Sasa, Manabu. 1974. Comparison. By statistical analy- 2155
sis of the microfilaria survey data obtained with
the membrane filtration method and the thick
blood smear method in Fiji and Tonga in 1972 by
Dr. Desowitz. Unpublished. 1-14.
- Sasa, Manbu. 1967. Microfilaria survey methods and 2160
analysis of survey data in filariasis control
programmes. Bull. Wld. Hlth. Org. 37: 629-650.
- Schlosser, Ralph J. 1945. Observations on the inci- 2091
dence of Wuchereria bancrofti larvae in the
native population of the Solomon Islands area.
American Journal of Tropical Medicine. 25:
493-495.
- Self, L. S., M. H. M. Abdulcader and M. M. Tun. 1969. 2050
Preferred biting sites of Culex pipiens fatigans
on adult Burmese males. Bull. Wld. Hlth. Org.
40 (2): 324-327.
- Seo, B. S., S. H. Lee, S. Y. Cho and S. Y. Kang. 2157
1974. Studies on the mass treatment of Malayan
filariasis with diethylcarbamazine in Cheju
Island, Korea. Third International Congress
of Parasitology. VB13 (43): 649-650.

- Simpson, E. J. B. 1957. Mass therapy in filariasis. 2110
Note on control in Niue Island. N. Z. Med. Jour.
56: 136-137.
- Southgate, B. A. 1971. Studies on filariasis in the 2001
Pacific. 1. Field trial of a counting chamber
technique for the determination of microfilarial
rates and densities. Unpublished. 1-14.
- Southgate, B. A. 1974. Quantitative approach to 2156
parasitological techniques in bancroftian filaria-
sis and its effect on epidemiological under-
standing. Trans. Roy. Soc. Trop. Med. Hyg. 68
(3): 177-185.
- Stone, Alan and Leon Rosen. 1952. New species of Aedes 2118
from Tahiti (Diptera: Culicidae). Proceedings
Hawaiian Entomological Society. 14 (3): 425-428.
- Suzuki, T. and F. Sone. 1973. Bionomics of filariasis 2100
vectors in Western Samoa. Wld. Hlth. Org. Monogr.
Ser. #FIL/73.115 & VBC/73.443: 1-15.
- Suzuki, T. and F. Sone. 1973. Filarial infection in 2101
vector mosquitos after mass drug administration
in Western Samoa. Wld. Hlth. Org. Monogr. Ser.
#FIL/73.117 & VBC/73.446: 1-13.
- Swartzwelder, John Clyde. 1941/45. Filariasis bancrofti 2075
Preventive medicine in World War II. Volume VII
Communicable diseases. Washington, D.C.: Depart-
ment of the Army. 5, 63-71.
- Swezey, O. H. 1941. Culicidae of Guam. Bernice P. 2111
Bishop Museum - Bulletin. #172: 199-200.
- Symes, C. B. 1960. Observations on the epidemiology 2000
of filariasis in Fiji. Jour. Trop. Med. Hyg.
63 (1): 1-14.
- Symes, C. B. 1960. Observations on the epidemiology 2006
of filariasis in Fiji. Part II. Laboratory
studies and human infection. Jour. Trop. Med.
Hyg. 63 (1): 31-44.
- Thieme, J. C., I. Esera and Tin Maung Maung. 1968. 2126
Preliminary results of filariasis control
project in Western Samoa. Unpublished. 1-64.
- Unknown, 1973. Raw data. Western Samoa. Unpublished 2130
1-14.

- Unknown. 1969. Raw data - Tahiti & Tubuai Islands -
filariasis. Unpublished. 1-24. 2138
- Unknown. 1974. Resultat hematologique des communes
de Tahiti et Moorea Maiao. Unpublished. 1-30. 2139
- Unknown. 1969. D - Activite de la section filarose.
Unpublished. 54-72. 2141
- Unknown. 1964. Tableau no. 2: Resultats des enquetes
cliniques filariennes pratiques a Tahiti en
1949, 1958 et 1964. Unpublished. 1-6. 2143
- Unknown. 1954. Lutte antifilarienne dans les estab-
lissements francais de l'Oceanie. Unpublished.
1-14. 2145
- Usinger, R. L. and Ira La Rivers. 1953. Insect life
of Arno. Excerpts. Atoll Research Bulletin.
#15: 15-16. 2120
- Venner, Robert B. 1944. Filarial problem on Nanumea.
U.S. Naval Medical Bulletin. 43 (5): 955-963. 2019
- Wang, Yi Chang and Ping Chin Fan. 1973. Evaluation
of methods for diagnosis of microfilaraemia on
Kinmen (Quemoy) Islands. S. E. Asian Jour.
Trop. Med. Publ. Hlth. 4 (3): 324-328. 2068
- Webber, R. H. 1974. Filariasis in the Solomon Islands.
Unpublished. 1-12. 2147
- Webber, R. H. 1974. Vector control of filariasis
in the Solomon Islands. Unpublished. 1-11. 2161
- Webster, Earle H. 1946. Filariasis among white immi-
grants in Samoa. U.S. Naval Medical Bulletin.
46: 186-192. 2099
- WHO Expert Committee on Filariasis. 1967. Second
report. Wld. Hlth. Org. Techn. Rep. Ser. #359:
5-47. 2056
- Williams, J. 1969. Filariasis surveys - April 1968 &
June 1969. Raw data from Author - Dr. Desowitz.
1-6. 2023
- World Health Organization Regional Office for the Western
Pacific and the South Pacific Commission. 1968.
Second WHO/SPC joint seminar on filariasis. Final
report. Wld. Hlth. Org. Monogr. Ser. #WPR/350/
68: 1-44. 2042

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