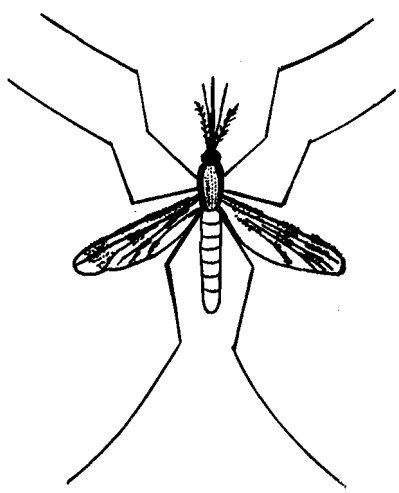
5TH PREVENTIVE MEDICINE UNIT

65TH MEDICAL GROUP, F A S COM



ANNUAL MOSQUITO REPORT — 1967

WITH SUMMARY OF SIX-YEAR MOSQUITO SURVEY

TABLE OF CONTENTS

INTRODUCTION 1

FIGURES

1. Mosquito light trap distribution 1962 - 1967 . . . 4
2. Total mosquitoes collected per month 5
3. Seasonal distribution of adult mosquitoes during 1967 6
4. Malaria and related vectors during 1967 9
5. Japanese B encephalitis and related vectors during 1967 10

TABLES

1. Monthly catches of all mosquitoes 5
2. Seasonal distribution of adult mosquitoes during 1967 6
3. Mosquito collection (1967) compared with 6-year average 7
4. Yearly catches of mosquito species 8
5. Mean temperature data on eight meteorological stations 11
6. Mean precipitation data based on eight meteorological stations 11

SIX-YEAR SUMMARIES OF EACH TRAP SITE 12-41

MOSQUITO REPORT 1967

INTRODUCTION

This year's mosquito report attempts to give a clearer picture of mosquito populations in Korea by summarizing data since 1962. The mosquito survey began in 1959 and by 1962 the survey pattern used presently was established. The 1967 mosquito survey was conducted from April to October.

Mosquitoes and Diseases: During 1967 more mosquitoes were collected than any year previous. The most abundant mosquito was Anopheles sinensis, the malaria vector. The number of Korean cases of Malaria was the highest since 1963, however the U.S. Forces Korea (USFK) recorded only one case of indigenous malaria. Anopheles sinensis accounted for more than 39 per cent of all mosquitoes collected during 1967 while 31 per cent is the 6-year average. This increase in malaria vectors may have been the cause of the increased number of malaria cases.

A heavy outbreak of Japanese B Encephalitis was expected during 1967 but fewer cases were reported than during the previous year. This upset the 3-year cycle theory used to try and predict the disease incidence. Culex tritaeniorhyncus, the vector associated with this encephalitis, had an increased percentage (5 per cent) of the total mosquitoes above 4 per cent for the 6-year average. However Culex pipiens, which is sometimes mentioned as a potential vector of Japanese B Encephalitis, accounted for

22 percent of the total mosquitoes collected but this percentage was down from the 30 per cent found for the 6-year average.

For the most part, Korea was hotter and dryer than normal during 1967, however more than usual precipitation during June and July produced the bumper crop of mosquitoes.

Methods and Procedures: A map to the mosquito light trap sites is provided to locate the traps within any area of concern. Also a summary of medically important mosquito collections from each trap site is given to aid in the identification of local mosquito problems. Graphs and charts will be used to present data most vital to vector control personnel.

Since the survey was initiated in 1959, standard New Jersey light traps have been used. This trap captures flying insects which are attracted to its light source. Light traps were placed at military installations and whenever possible these traps were attached to the security lighting systems. When this was not possible, timers were wired to the traps in order to turn them on and off at dusk and dawn respectively.

Data Problems: Unfortunately data over the past 6 years have not been consistantly collected. Mosquito collections were sent from the trap sites without information on the number of nights the collections represented. This seriously hampered attempts to compile the data. Previous reports refer to the average number of mosquitoes per collection, but this unit of measure is deceiving because the collection periods varied. Therefore year to year and

trap to trap comparisons are not objective. Attempts are being made to improve data collection and correct this deficiency.

Acknowledgments: The combined efforts of numerous individuals located throughout South Korea made this report possible. Due to the large number of people involved only a few can be cited here: Captain James M. Neely and Captain George L. Geis, Commanding Officers of the 5th Preventive Medicine Unit; Captain David L. Kimbell, former Laboratory Officer who was also Commanding Officer for a short while; the enlisted men of the 5th Preventive Medicine Unit and the personnel who sent specimens to the laboratory from the light traps in their respective areas.

Finally, a special word of thanks is deserved by the civilian entomologists of the Survey Section who, have provided the taxanomic determinations: Mr. Chong Chun-sik, Mr. Yu Hyo-sok, Mrs. Cho Hu-cha, and Mrs. Chu Chong-ae. Mr. Han Man-su did most of the calculation for this years report.

J. WANLESS SCUTHWICK
CPT Entomologist
CIC, Survey Section

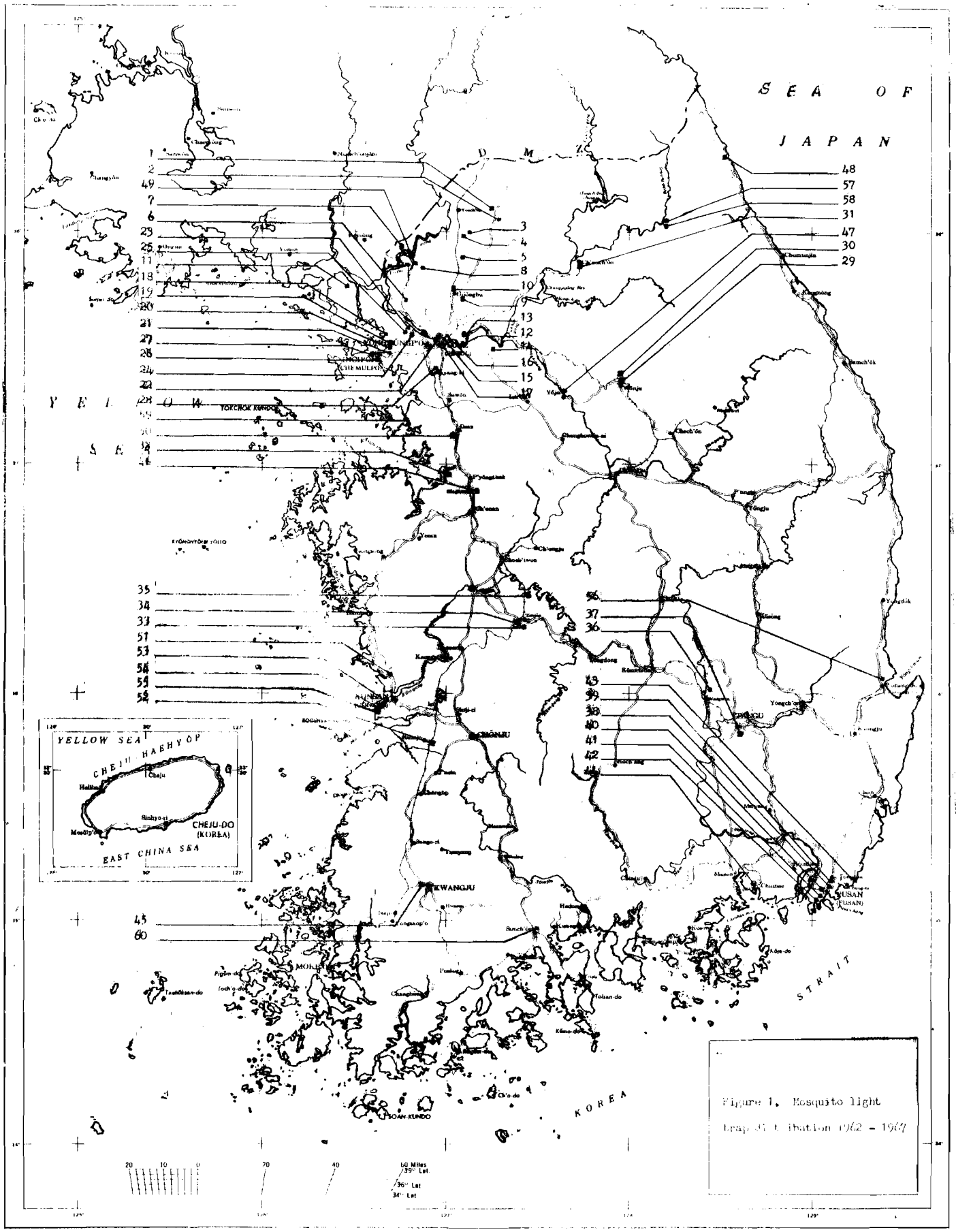


Figure 1. Mosquito light trap collection 1962 - 1969

Table 1. Monthly catches of all mosquitoes

Month	1962	1963	1964	1965	1966	1967	6-year total	6 year average
MARCH		3			55		58	9.7
APRIL	104	162	242	54	204	100	866	144.3
MAY	3914	3952	4393	2567	8481	9610	32917	5486.2
JUNE	23416	28810	42858	27856	55142	71420	249502	41583.7
JULY	80643	37438	119392	84703	63336	128621	514133	85688.8
AUG	57535	36862	36978	42173	18732	108807	301087	50181.2
SEPT	47258	67744	15414	31571	14573	28333	204893	34148.8
OCT	14876	9339	4672	20232	7877	4594	61590	10265.0
NOV	1577						1577	262.8
TOTAL	229323	184310	223949	209156	168400	351485	1366623	227770.5

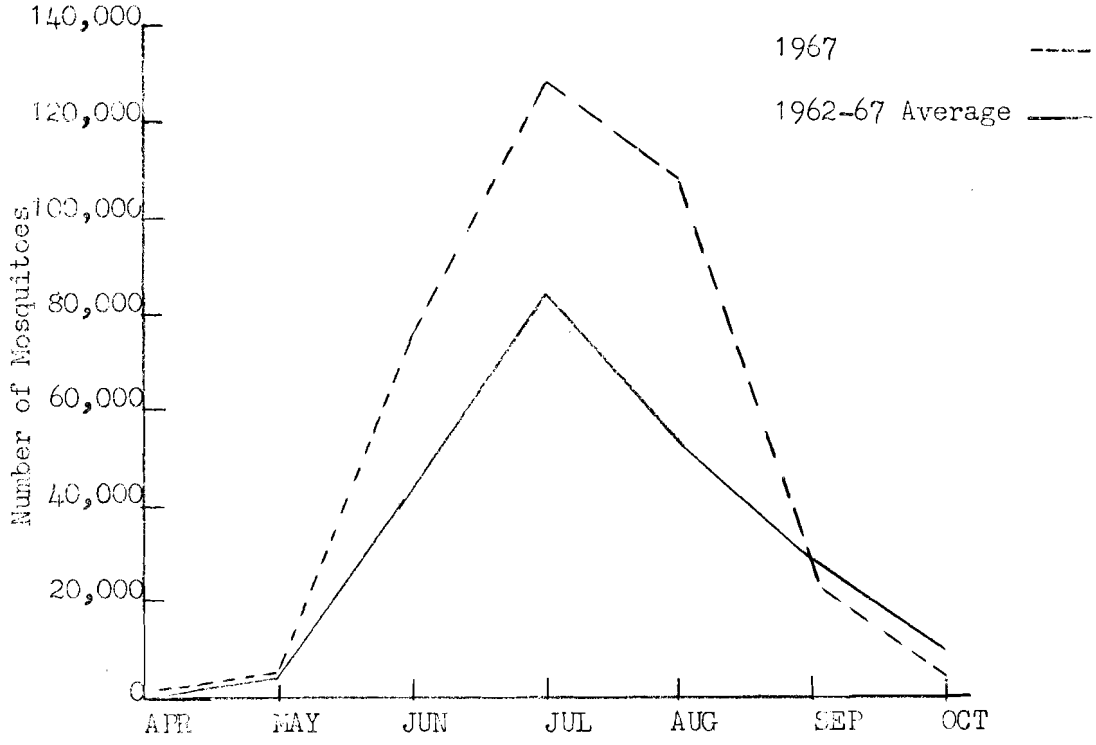


Figure 2. Total mosquitoes collected per month

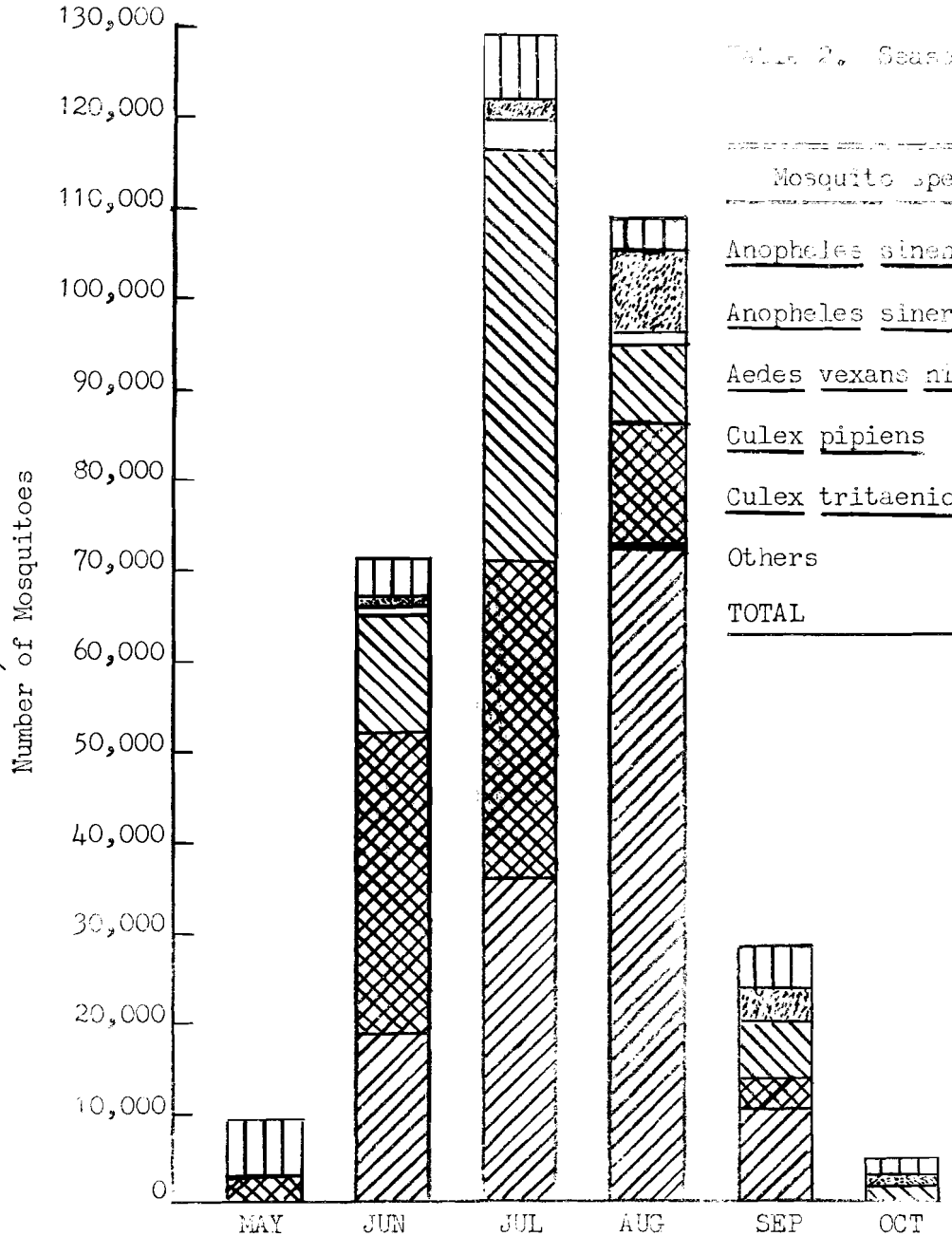


Table 2. Seasonal distribution of adult mosquitoes during 1967

Mosquito species	Apr	May	Jun	Jul	Aug	Sep	Oct
Anopheles sinensis	27	461	18828	36053	72716	11553	164
Anopheles sineroides		38	1181	4539	1166	241	11
Aedes vexans nipponii	17	2846	34492	35130	14848	4851	561
Culex pipiens	33	298	13162	46031	9451	6802	2564
Culex tritaeniorhynchus		2	507	3817	9610	3509	854
Others	23	5965	3250	3001	302	1377	169
TOTAL	100	9610	71420	128621	108807	28333	4594

Figure 3. Seasonal distribution of adult mosquitoes during 1967

Table 3. Mosquito collection (1967) compared with 6-year average

Mosquito species	1967 total	Per cent of 1967 total	1962-67 average	Per cent of average
GENUS ANOPHELES				
Anopheles japonicus			0.33	0.00
Anopheles koreicus			0.33	0.00
Anopheles lesteri	31	0.01	5.16	0.00
Anopheles pullus	13	0.00	364.66	0.16
Anopheles sinensis	139802	39.77	70911.50	31.16
Anopheles sineroides	7176	2.04	2414.33	1.06
Anopheles yatsushiroensis	5	0.00	0.83	0.00
GENUS AEDES				
Aedes albopictus	1	0.00	0.66	0.00
Aedes chemulpoensis			0.66	0.00
Aedes dorsalis	1501	0.43	508.16	0.22
Aedes esoensis	2	0.00	1.16	0.00
Aedes flavopictus			2.16	0.00
Aedes hatorii	1	0.00	19.33	0.01
Aedes japonicus			0.50	0.00
Aedes koreicus			1.16	0.00
Aedes lineatopennis	16	0.01	73.66	0.03
Aedes nipponicus			0.66	0.00
Aedes togoi			1.16	0.00
Aedes vexans nipponii	92745	26.37	61094.83	26.85
GENUS CULEX				
Culex bitaeniorhynchus	911	0.26	1406.00	0.62
Culex hayashii			4.00	0.00
Culex mimeticus			5.50	0.00
Culex orientalis	3211	0.91	3213.00	1.41
Culex pipiens	78341	22.28	69870.33	30.70
Culex rubensis			0.50	0.00
Culex sinensis			26.16	0.01
Culex tritaeniorhynchus	18299	5.22	8977.00	3.94
Culex vagans	8319	2.37	4184.00	1.84
Culex vishnui			14.83	0.01
Culex vorax			0.33	0.00
Culex whitmorei	1110	0.32	4468.50	1.96
MISCELLANEOUS GENERA				
Armigeres subalbatus	1	0.00	1.00	0.00
Mansonia uniformis			0.16	0.00
Tripteroides bambusa			1.16	0.00
TOTAL	351485	99.99	227573.80	99.98

Table 4. Yearly catches of mosquito species

Mosquito species	1962	1963	1964	1965	1966	1967	6-year total	6-year average
Anopheles japonicus				1	1		2	0.33
Anopheles koreicus				1	1		2	0.33
Anopheles lesteri						31	31	5.16
Anopheles pullus	470	955	177	531	42	13	2188	364.66
Anopheles sinensis	63247	56268	98782	48656	18714	139802	425469	70911.50
Anopheles sineroides	848	1433	2706	1266	1057	7176	14486	2414.33
Anopheles yatsushiroensis						5	5	0.83
Aedes albopictus	1	2				1	4	0.66
Aedes chemulpoensis			2		2		4	0.66
Aedes dorsalis	63	737	420	249	79	1501	3049	508.16
Aedes esoensis		2	3			2	7	1.16
Aedes flavopictus		2		11			13	2.16
Aedes hatorii	2	2		111		1	116	19.33
Aedes japonicus	1	1	1				3	0.50
Aedes koreicus	2	5					7	1.16
Aedes lineatopennis	16	78	328	4		16	442	73.66
Aedes nipponicus	1			3			4	0.66
Aedes togoi	1		6				7	1.16
Aedes vexans nipponii	45152	39676	52895	44202	91899	92745	366569	61094.83
Culex bitaeniorhynchus	2790	1415	1523	1002	795	911	8436	1406.00
Culex hayashii				24			24	4.00
Culex mimeticus	29	3	1				33	5.50
Culex orientalis	4094	2114	2653	4397	2809	3211	19278	3213.00
Culex pipiens	76256	73939	55198	96807	38681	78341	419222	69870.33
Culex rubensis	2	1					3	0.50
Culex sinensis	138		1				157	26.16
Culex tritaeniorhychus	16617	1553	6236	6148	18	18299	53862	8977.00
Culex vagans	5048	83	276	3807	5009	8319	25104	4184.00
Culex vishnui			88		7571		89	14.83
Culex vorax	1		1		1		2	0.33
Culex whitmorei	14603	6041	2652	2085			26811	4468.50
Armigeres subalbatus	5				320	1110	6	1.00
Mansonia uniformis	1					1	1	0.16
Tripteroides bambusa				5	2		7	1.16
TOTAL	229388	184310	223949	209310	167001	351485	1365443	227573.71

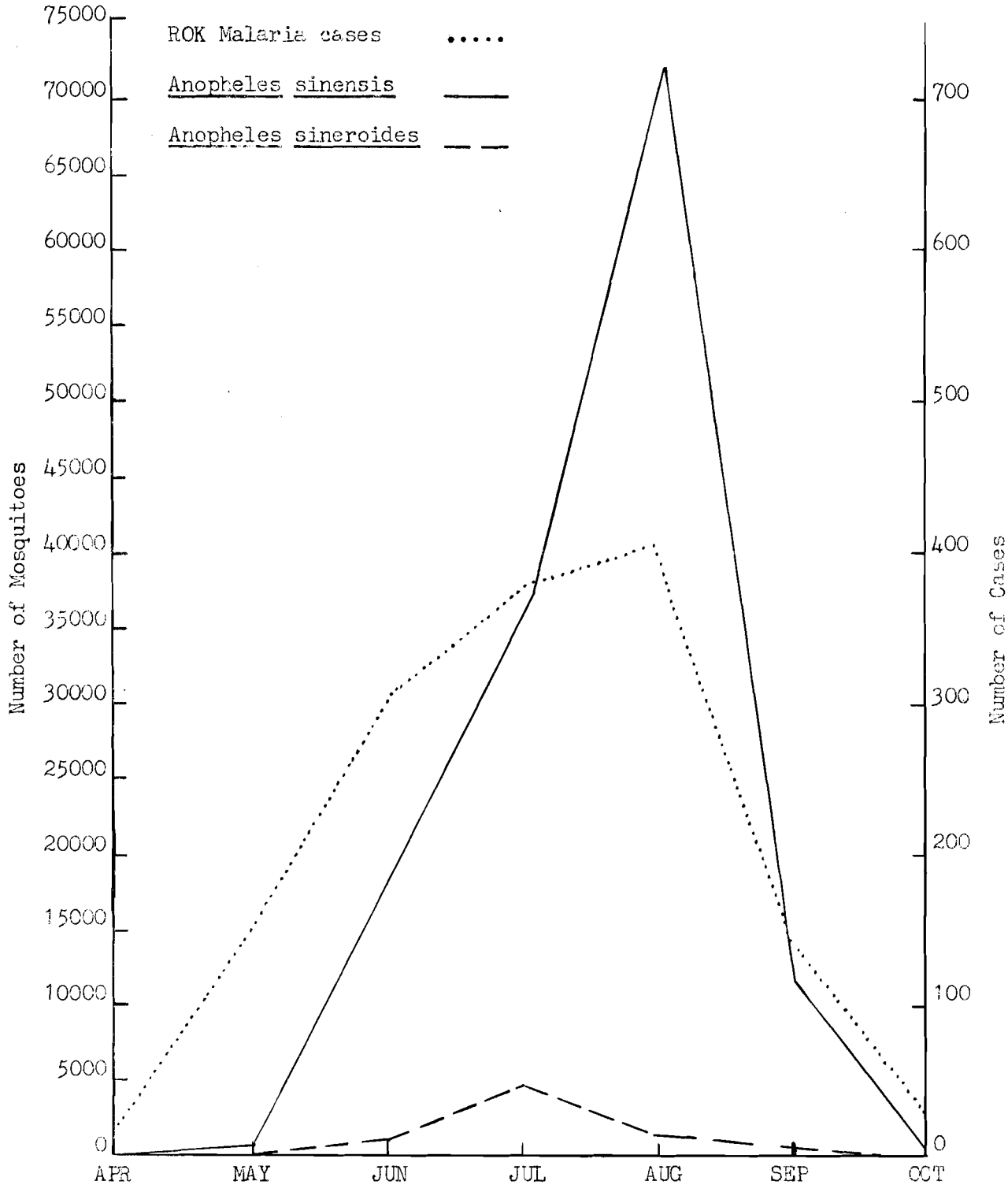


Figure 4. Malaria and related vectors during 1967

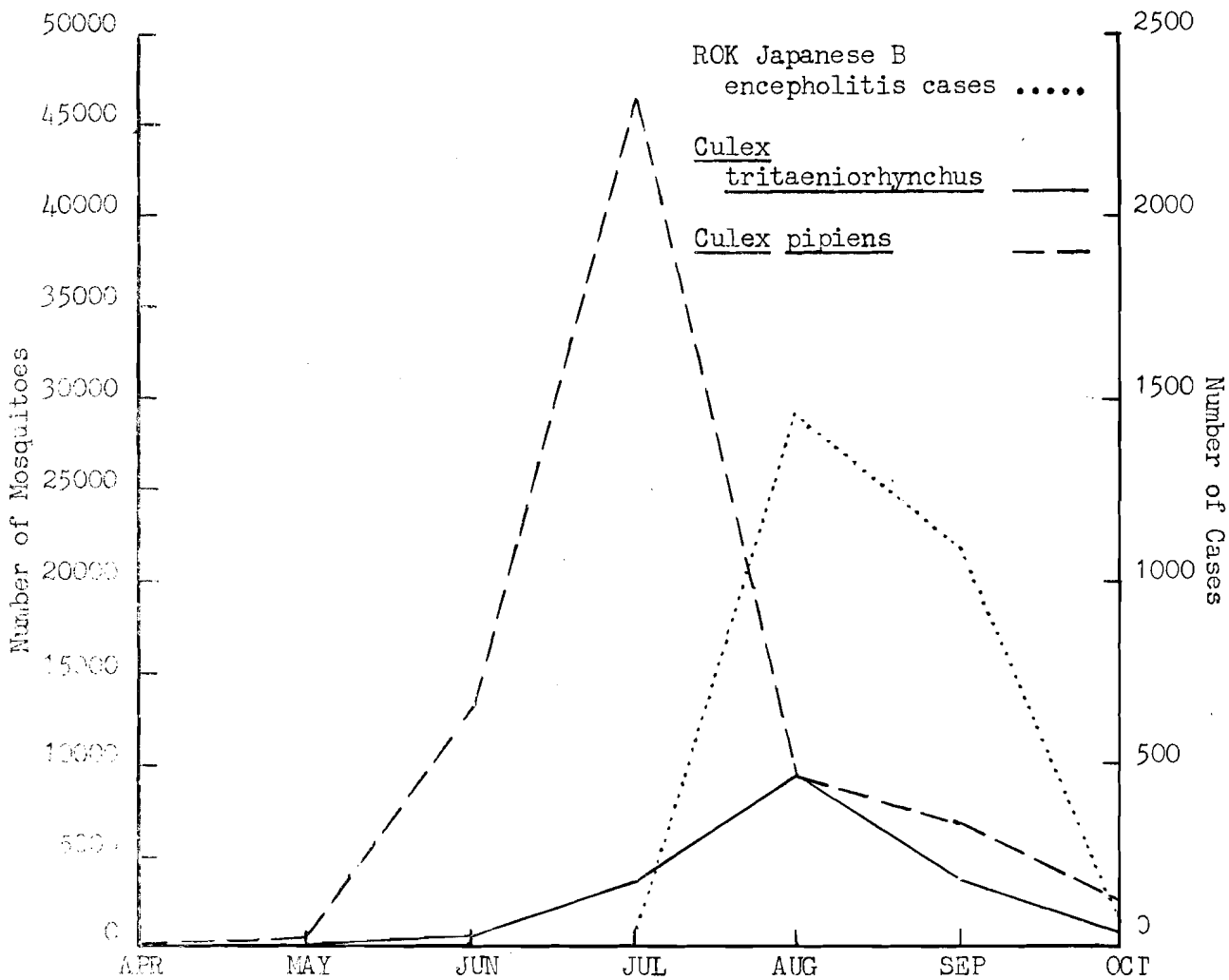


Figure 5. Japanese B encephalitis and related vectors during 1967

Table 5. Mean temperature data on eight meteorological stations*

Month	1967 Average	Normal	Difference from normal
Jan	-2.5 c	-2.0 c	-0.5 c
Feb	-0.5	+0.1	-0.6
Mar	+6.2	+5.1	+1.1
Apr	+12.0	+11.3	+0.7
May	+18.9	+16.5	+2.4
Jun	+21.3	+20.6	+0.7
Jul	+25.1	+24.4	+0.7
Aug	+27.3	+25.3	+2.0
Sep	+20.5	+20.5	0.0
Oct	+14.8	+14.3	+0.5
Nov	+7.7	+8.0	-0.3
Dec	-2.4	+1.2	-3.6

Table 6. Mean precipitation data based on eight meteorological stations*

Month	1967 Average	Normal	Difference from normal
Jan	+40.5 mm	+23.8 mm	+16.7 mm
Feb	+36.6	+34.9	+1.7
Mar	+66.1	+60.1	+5.9
Apr	+93.9	+75.4	+18.5
May	+43.3	+85.1	-41.8
Jun	+135.3	+120.2	+15.1
Jul	+197.8	+137.5	+60.3
Aug	+123.1	+188.2	-65.1
Sep	+157.9	+168.1	-10.1
Oct	+46.6	+56.7	-10.1
Nov	+75.3	+46.9	+28.4
Dec	+8.2	+34.6	-26.4

* Eight meteorological stations represent Chunchon, Kangnung, Seoul, Inchon, Taegu, Kwangju, Pohang, Pusan from which normal was tabulated