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STATUS OF AEDES AEGYPTI ERADICATION IN THE AMERICAS

In compliance with the instructions of the Directing Council, in 1947, the Pan American Sanitary Bureau has been promoting and coordinating the eradication of Aedes aegypti in the Americas for the last 18 years.

During that period the Bureau has encouraged the infested countries and territories to begin or intensify their campaigns against this vector, and has also assisted them, within its budgetary limits, by providing them with advisory services, as well as supplies and equipment.

The Governing Bodies of the Organization have repeatedly emphasized how necessary it is for countries and territories still infested to complete their eradication programs at the earliest possible date so as to reduce the duration of the continental A. aegypti eradication campaign and thus the growing danger of reinfestation of areas already free of the vector.

To date the following countries and territories have completed their eradication campaigns and been declared free of A. aegypti: Argentina, Brazil, British Honduras, Bolivia, Chile, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Paraguay, Peru, Uruguay, and the Canal Zone. Two additional countries which had already achieved eradication, namely, El Salvador and Mexico, were found to be reinfested in 1965.

In Mexico reinfestation was limited to a small area in the city of Nuevo Laredo, on the United States border, and was promptly eliminated. The reinfestation in El Salvador, on the other hand, was much more extensive, as indicated in another part of this document, and the Government consequently had to resume the eradication campaign.

In addition to this reinfestation in Central America, the problem of A. aegypti still persists in the northern part of South America, in the United States of America, and in the Caribbean Area.

In the northern part of South America the campaign is in the final phase in Colombia, where in 1965 and 1966 the mosquito was found only in

the city of Cucuta. However, Venezuela, Guyana, Surinam, and French Guiana continue to be extensively infested.

The United States whose campaign includes Puerto Rico and the U.S. Virgin Islands, began eradication activities in 1964, but results to date have been limited.

In the Caribbean Area the campaign is in the final phase in Trinidad and continues to make progress in Cuba, but it is still suspended in Jamaica, the Dominican Republic, British Virgin Islands, Guadeloupe, and Dominica. In the remainder of the Caribbean Area the campaign is either halted or progressing slowly, and results are not satisfactory.

As mentioned on other occasions, one of the main obstacles to campaigns in the Caribbean Area and northern South America is the resistance of A. aegypti to chlorinated insecticides. But resistance is only part of the problem. Its occurrence is clearly due in some measure to the fact that for one reason or another many of the campaigns were prolonged for several years without the vector being eradicated despite the fact that the mosquito was still highly susceptible to DDT when they were begun.

As previously reported, the Organization established a small laboratory in Kingston, in cooperation with the Government of Jamaica and the University of the West Indies, for the purpose of solving the problem of vector resistance. Since its inception in 1962, the laboratory has studied the susceptibility to various insecticides of several A. aegypti strains from the Caribbean and northern South America, and also tested new products for possible use instead of chlorinated insecticides.

To date the laboratory has tested the susceptibility to chlorinated insecticides of A. aegypti from 66 localities in 18 countries and territories of the above areas. The results of these tests, together with the data already collected by various investigators, indicated that, but for rare exceptions, the mosquito strains in those areas are resistant to DDT or dieldrin, or to both.

The laboratory simultaneously tested the susceptibility of several of these mosquito strains to other insecticides that might possibly replace chlorinated insecticides; it also tested the residual action of some of the insecticides in the various types of receptacle in which A. aegypti commonly breed in the Caribbean Area and in South America.

Of the new insecticides studied, one in particular proved effective against mosquito strains resistant to chlorinated insecticides. It is a phosphorus compound of low toxicity for mammals, and has prolonged residual action. The product is already available commercially under the name of Abate, and is currently being subjected to more extensive field

test in both Jamaica and Venezuela. Should the results of these tests prove satisfactory, it is probable that large-scale use of the insecticide against A. aegypti will be begun within a few months.

Two more phosphorus insecticides, namely, malathion and fenthion, should be mentioned. For some time now both have been used in eradicating the mosquito in Puerto Rico, Venezuela, and Barbados, with what might be considered satisfactory results. These products have a shorter residual action than either DDT or dieldrin, but the results they have given in the areas mentioned indicate that where resistant to chlorinated insecticides the vector can be eradicated with these two insecticides.

Nevertheless it is evident that the solution of the resistance problem alone will not succeed in solving the eradication problem in either the Caribbean Area or northern part of South America. If campaigns in these areas are to be successful, other difficulties encountered in most of the countries and territories still infested will have to be surmounted. Among these difficulties the following may be mentioned:

- a) insufficient budgetary allocations to permit appropriate coverage of infested areas;
- b) deficient campaign organization and administration;
- c) personnel problems which lessen the quality of field work required in this kind of campaign;
- d) deficient surveillance against the reintroduction of the mosquito into areas already free of it, and
- e) absence of, or noncompliance with, the legislation necessary to support the campaign.

The status of the A. aegypti campaign in each country or territory still infested is summarized below.

Colombia. In 1961 the mosquito was eradicated in this country, but in September of that year the city of Cucuta, on the Venezuela border was found to be reinfested. In the following year, the city of San Luis, situated 1 km. from Cucuta on the highway to Venezuela, was also found to be reinfested.

These two foci of reinfestation were eliminated in 1963, but that same year a small A. aegypti breeding place was found in the port of Santa Marta on the north coast of the country. That breeding place and another one found in the same port the following year both originated from mosquitoes introduced by vessels coming from Caribbean ports; both foci were promptly eliminated, and by early 1965 the entire territory of Colombia was considered free from the vector.

Nevertheless, the city of Cucuta was again found to be reinfested in late 1965, despite the fact that between January 1964 and July 1965 it had been inspected 7 times, and the results had been negative. In view of the reinfestation, eradication work was resumed in November 1965, but by April 1966 reinfestation had not been eliminated.

According to the last inspection made by the vigilance service, the entire country, except for Cucuta, is considered free of the mosquito. In 1965 the service inspected San Luis twice and Santa Marta three times, without finding A. aegypti. In addition to these two localities, during the year the service also inspected the ports of Barranquilla, Buenaventura, Cartagena, and Las Flores, and the international airports of Barranquilla and Cali, as well as 27 localities in the Departments of Bolivar and Santander del Norte, the Intendencias of La Guajira, San Andres, and Providencia, and all inspections were negative.

Cuba. Eradication activities on the island are still almost exclusively limited to the Provinces of La Habana, Matanzas, and Pinar del Rio. Aside from those areas, campaign activities were confined to a few surveys and to treatment in some localities in the Provinces of Las Villas, Camaguey, and Oriente. The results of the past four years have been more limited than was expected, owing mainly to the repeated reinfestations of work areas into which used tires are introduced from other still infested areas of the country which the campaign has not yet covered.

Reinfestation reached alarming proportions during the period 1962-1963, because large numbers of used tires containing A. aegypti reached Greater Havana and neighboring localities. However, beginning in 1964, there was a considerable reduction in the importation of such tires, and the measures taken to control the existing stocks of tires improved the situation. The problem has not yet been completely solved.

In Cuba, the originally infested area measures approximately 100,000 square kilometers, of which 30,000 (or 30%) is being covered by the campaign. In the initial survey the number of localities inspected up to May 1966 was 1,047, of which 805 were found infested with A. aegypti; 802 of the initially positive localities were treated, after which 783 of them have already been inspected. At last inspection, 83 of the verified localities continued positive, and 700 were already negative.

Dominican Republic. The eradication work in this country was suspended in 1962, and has not yet been resumed.

El Salvador. The A. aegypti eradication campaign was completed in 1957. The special verification of the country, conducted from May 1958 to November 1959 with the assistance of PAHO, confirmed the eradication. In 1960, at the XII Meeting of the Directing Council of PAHO, El Salvador was declared free of A. aegypti.

On completion of the special verification, a vigilance service was organized. From 1960 to 1964 the service made a yearly inspection of all localities most exposed to reinfestation, including the capital, San Salvador; all the inspections were negative.

However, during a further inspection made in San Salvador in June 1965, the capital city was found reinfested. It was at first believed that reinfestation was limited to certain areas of the city, and the Government promptly resumed eradication activities there. But once campaign activities were resumed, the situation became better known, and current data show that the problem is far more serious than was at first believed, and that a considerable intensification of the campaign will be necessary.

In December 1965, a complete inspection of the capital indicated that infestation had spread over the entire city, in which there are about 80,000 houses. A survey of a 12-kilometer radius around the capital showed that of the 28 localities inspected, 24 were also infested by the mosquito.

Although it is known that ecological conditions in the remainder of the country are favorable to the mosquito, the situation there is not yet known. However, considering the population density and means of communication, other areas are presumably reinfested by now.

Guyana. After being free of the mosquito for several years, this country became extensively reinfested in 1962, but the Government could not resume the eradication campaign until 1965. To date, activities have been limited to Georgetown, but despite repeated treatment of the city, results have not been satisfactory owing to both technical and administrative difficulties since resumption of the campaign. They include low susceptibility of the mosquito to chlorinated insecticides, the problem of breeding places in inaccessible water container, and deficient field work.

Haiti. In this country the campaign was suspended in 1958, and has not yet been resumed.

Jamaica. The A. aegypti campaign continued to be limited to control measures at international airports and the port areas of Kingston and Montego Bay. The eradication campaign was suspended in 1961, and the Government decided not to resume it because the mosquito is resistant to chlorinated insecticides.

Trinidad and Tobago. The campaign is in the final phase in Trinidad, and except for Port-of-Spain, the island is considered free of A. aegypti. The mosquito continues to be found in the port area of Port-of-Spain and in small vessels coming from still infested Caribbean ports. The repeated infestations in the capital in the past three years have been attributed to these vessels. During that time, attempts were made to institute measures to prevent these vessels from continuing to bring in the mosquito, but the problem has not yet been solved.

Tobago continues free of the vector.

United States of America. The campaign in this country was begun in May 1964, but to date work is being done only in part of the presumably infested areas, and the results are still limited.

The area presumably infested by A. aegypti measures approximately 1,550,000 square kilometers, and includes part or all of nine States in the South East of the country, as well as Puerto Rico and the U. S. Virgin Islands. Up to March 1966, 649 counties on the mainland, 56 in Puerto Rico, and 3 in the Virgin Islands were inspected in initial survey. All counties inspected in Puerto Rico and the Virgin Islands, and 248 of those inspected on the mainland, were positive.

Of the initially positive counties, 30 on the mainland, 36 in Puerto Rico, and 3 in the Virgin Islands were treated. After treatment, all were inspected at least once, and at the last inspection all continued to be positive.

Venezuela. Campaign progress in the past four years was hampered by serious administrative and technical difficulties, and the results have been limited. Among the difficulties encountered were:

- a) insufficient funds to permit appropriate coverage of infested areas;
- b) field personnel problems;
- c) reinfestation of localities previously considered negative, by A. aegypti imported from other still infested localities, or from the Caribbean;
- d) almost country-wide mosquito resistance to chlorinated insecticides, which necessitated the use of more expensive insecticides of shorter residual action than either DDT or dieldrin.

To ensure success the Government is making a complete review of the campaign, and studying possibility of increasing the budget and adopting additional measures in order to accomplish country-wide A. aegypti eradication within six years.

FRANCE

French Guiana. A survey made by the Government in 1964 revealed that reinfestation of the capital of that Department in 1963 had covered the city of Cayenne and environs and several localities in the interior of the country. Eradication work, however, has not been resumed to date.

Guadeloupe. The campaign was suspended in 1962, and has not been resumed as yet. The A. aegypti campaign continues to be limited to certain control measures at the international airport and island ports.

Martinique. No specific A. aegypti eradication campaign has as yet been begun on this island. The Government has been conducting a general insect control program for several years, but as far as A. aegypti is concerned the results are limited.

St. Martin. The French part of his island is still negative, but no recent information is available.

KINGDOM OF THE NETHERLANDS

Aruba and Bonaire. Aruba is still negative, but the island of Bonaire, which was reinfested in 1965, is positive.

Curaçao. The island is still extensively infested. Activities against A. aegypti continue to be limited to the Willemstad port area, where results are not satisfactory.

Saba and St. Eustace. These two islands continue to be negative, but no recent information on their situation is available.

St. Maarten. The Dutch part of this island continues to be infested, and no work against A. aegypti is being done.

Surinam. Eradication work was begun in 1963, but the results obtained up to March 1966 have been very limited. Paramaribo, where most efforts were concentrated, was treated and inspected many times during that period, but the infestation index remained high, owing to the development of mosquito strains resistant to chlorinated insecticides, and also to administrative problems.

In addition to Paramaribo, the international airport of Surinam, the border localities of Albina and Nickerie, and nine small localities near the capital were repeatedly inspected and treated, but in all of them the results were as limited as those in Paramaribo.

Because of mosquito resistance to chlorinated insecticides, fenthion began to be used in May 1966

UNITED KINGDOM

Antigua and Barbuda. The campaign has not yet been resumed in Antigua despite the intensive infestation found in the island in 1964. The Government decided not to resume eradication work until a new insecticide with prolonged residual action became available to replace the chlorinated ones to which the mosquito is resistant.

The island of Barbuda continues to be considered negative.

Barbados. In the last four years only limited progress has been made in eradication work on this island. In 1962 the campaign personnel available was insufficient to maintain the work cycle, and results were therefore not satisfactory. The following year the campaign staff was augmented and their salaries increased, and it was then possible not only to shorten the work cycle but also improve the supervision of field personnel and the quality of work. Nevertheless, the results obtained that year, and those in 1964, were not satisfactory because the mosquito developed resistance to chlorinated insecticides.

The results obtained in the first half of 1965 were better, apparently owing to the change from chlorinated insecticide to fenthion.

The new insecticide began to be used in Bridgetown at the beginning of 1965, and in the rest of the island from April onwards. In December 1964 a total of 1,435 A. aegypti infested houses, distributed in 54 positive localities had been found in the island as a whole; in July 1965 the number of positive localities had fallen to 24 and the number of infested houses to 120.

However, from the September of that year onwards the number of positive localities increased as did the number of houses infested with A. aegypti. This increased infestation, after the initial success with the new insecticide, is attributed to shortcomings in field work such as: a considerable number of houses not inspected or treated because they were closed; incomplete or inadequate treatment of many potential breeding places; non-observance of the legislation supporting the campaign approved by the Government; and insufficient funds which deprived the program of sufficient staff to maintain an appropriate work cycle.

Dominica. The campaign in this island is still suspended.

Grenada. This island continues to be negative, but no recent information about the situation there is available.

Grenadines. In this group, Carraicou, Petite Martinique, Bequia and Union are still infested, and no A. aegypti eradication work is being carried out.

Bahamas. The campaign in these islands is still bogged down because of lack of funds and low susceptibility of the mosquito to chlorinated insecticides.

Cayman, Turk and Caicos Islands. The campaign has not yet been initiated in any of these islands.

Montserrat. This island became reinfested in 1964, and despite efforts of the campaign the reinfestation has not been eliminated.

St. Kitts, Nevis, and Anguilla. Nevis continues to be negative, but St. Kitts, which was reinfested in 1964, is still positive and eradication work has not been resumed. Anguilla is also infested, and does not have an appropriate eradication campaign.

St. Lucia. This island is extensively infested, yet campaign activities continue to be limited to Castries, the capital, and to Vigie, the site of St. Lucia's international airport. Owing to mosquito resistance to chlorinated insecticides, and to administrative difficulties, the results have been limited.

St. Vincent. This island was reinfested in 1965 and, according to the latest information available, reinfestation has not yet been eliminated.

Virgin Islands. The campaign in this territory was suspended in 1963, and has not been resumed to date.

Annexes: I. March 1966 Report on the Status of the Campaign in the Americas.

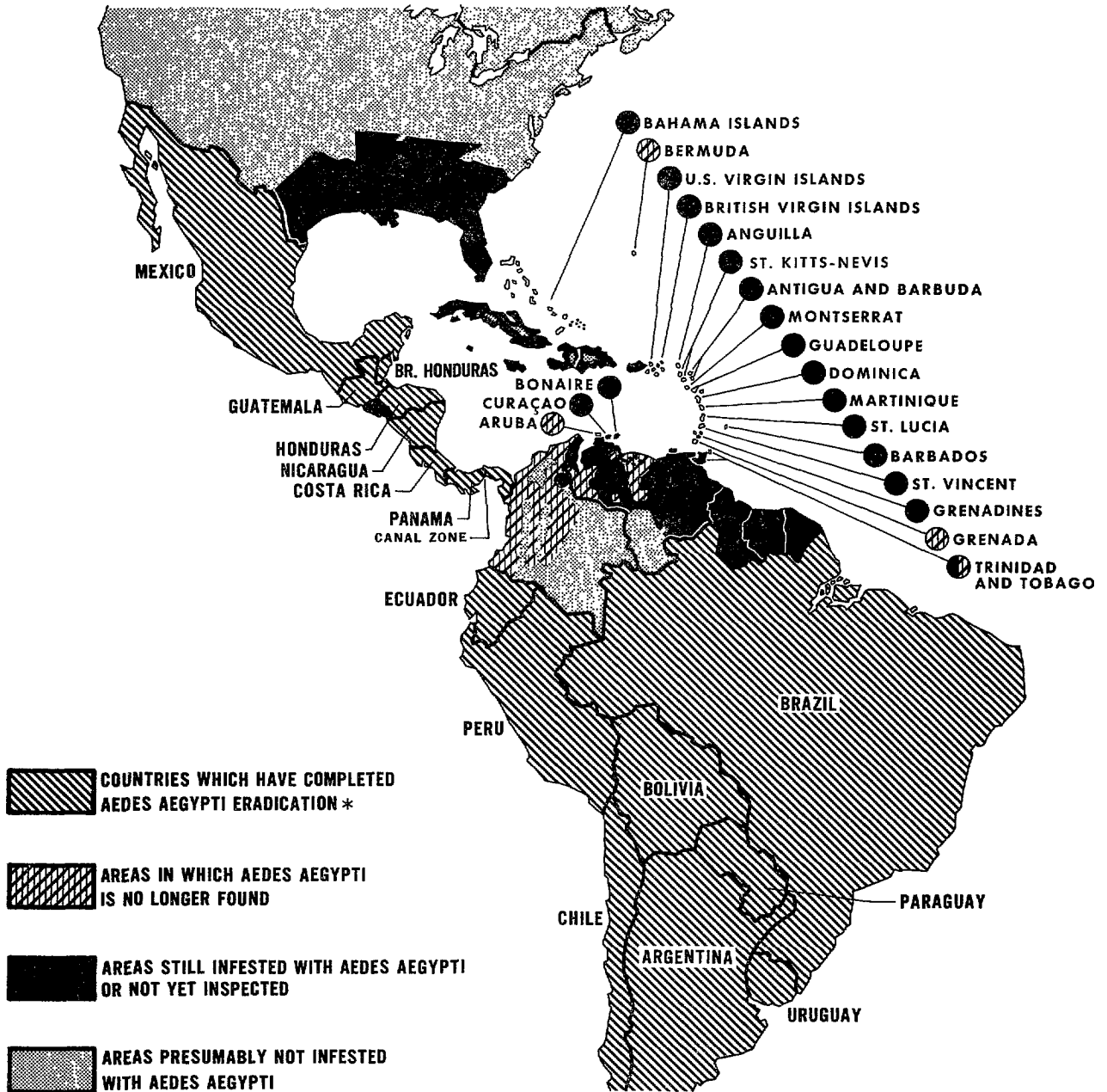
II. Map showing distribution of A. aegypti in the Americas, March 1966.

REPORT ON Aedes Aegypti ERADICATION CAMPAIGNS IN THE AMERICAS - MARCH 1966

Country	Date		Initial presumably infested area		Localities or other units inspected since inception of the campaign					Present status *
	Beginning	Last inspect.	Total km ²	% inspected	Number	Total	Initially positive			
							Treated			
							Total	Verified		
Total	Still positive									
Argentina	VI.53	X.65	1,000,000	100.0	3,741	165	165	165	-	EV
Bolivia	VI.32	II.55	100,000	100.0	282	65	65	65	-	E
Brasil	I.31	XII.65	5,358,822	100.0	268,576	36,119	36,119	36,119	-	EV
Colombia	XI.50	III.66	280,000	100.0	3,801	355	353	353	1	PA
Costa Rica	IV.49	V.55	20,000	100.0	1,342	104	104	104	-	E
Cuba	III.54	III.66	100,000	30.2	1,041	800	792	769	88	PA
Chile	VI.45	XII.65	104,373	100.0	301	48	48	48	-	EV
Ecuador	VI.46	XII.65	69,454	100.0	2,824	337	337	337	-	EV
El Salvador	IV.49	III.66	18,675	100.0	935	208	190	190	3	PA
United States	V.64	III.66	1,536,819	71.1	649	248	30	30	30	PA
Guatemala	I.49	III.66	36,423	100.0	2,485	138	138	138	-	EV
Haiti	X.53	IX.58	27,750	49.4	2,379	605	602	435	27	P
Honduras	IX.49	III.66	69,929	100.0	600	53	53	53	-	EV
Jamaica	II.50	VI.65	11,424	100.0	14	12	2	2	2	P
Mexico	I.51	III.66	1,000,000	100.0	4,272	600	600	600	-	EV
Nicaragua	I.50	VI.59	65,263	100.0	3,126	18	18	18	-	E
Panama	II.49	VI.60	56,246	100.0	2,853	44	44	44	-	E
Paraguay	I.48	III.66	200,000	100.0	1,561	98	98	98	-	EV
Peru	I.40	XII.64	638,000	100.0	4,320	191	191	191	-	EV
Dominican Republic	X.52	VIII.62	42,020	80.4	1,420	351	351	319	15	P
Trinidad and Tobago	I.51	III.66	3,108	100.0	128	122	122	122	1	PA
Uruguay	X.48	III.66	187,000	100.0	1,020	133	133	133	-	EV
Venezuela	VI.48	III.66	710,000	71.8	6,061	694	672	647	77	PA
Anguilla	IV.53	VI.65	88	100.0	19	19	19	19	18	P
Antigua	VIII.54	II.64	283	100.0	50	47	47	47	25	P
Aruba	III.52	VI.64	174	100.0	9	9	9	9	-	N
Bahamas	VI.54	III.66	11,396	1.3	13	10	10	10	10	PA
Barbados	III.54	III.66	171	100.0	99	98	98	98	34	PA
British Honduras	X.50	VII.59	22,965	100.0	84	2	2	2	-	E
Bermuda	I.51	1963	53	100.0	9	9	9	9	-	N
Bonaire	IX.52	III.66	246	100.0	6	6	6	6	1	PA
Curaçao	X.51	III.66	448	100.0	5	5	5	5	5	PA
Dominica	II.51	VI.65	789	50.0	136	66	66	66	16	P
Grenada	XI.52	VII.59	311	100.0	8	8	8	8	-	N
Grenadines	XI.52	VI.62	65	100.0	7	5	5	5	4	P
Guadeloupe	I.57	X.61	1,619	4.9	53	38	38	27	20	P
Guyana	III.46	III.66	4,662	100.0	93	21	21	21	3	PA
French Guiana	V.49	III.64	91,000	100.0	222	55	55	55	3	P
Caiman Island	-	-	259	-	-	-	-	-	-	P
Turks and Caicos Islands	-	-	430	-	-	-	-	-	-	P
Virgin Islands (US)	VIII.64	III.66	344	100.0	3	3	3	3	3	PA
Virgin Islands (UK)	III.60	II.63	174	74.6	23	23	23	23	8	P
Martinique	XI.53	III.66	1,000	100.0	34	21	19	19	18	PA
Montserrat	V.56	II.66	83	100.0	33	16	16	16	3	PA
Puerto Rico	IX.64	III.66	8,896	73.6	56	56	36	36	36	PA
Saba, St. Eustace	VII.58	VIII.59	31	100.0	16	15	15	15	-	N
St. Kitts-Nevis	IV.53	VI.65	308	100.0	43	43	43	43	7	P
St. Lucia	V.53	III.66	259	100.0	50	50	50	50	37	P
St. Martin	XII.58	III.64	34	100.0	18	15	15	15	15	P
St. Vincent	III.53	II.65	332	100.0	8	8	8	8	...	P
Surinam	XII.62	III.66	48,000	31.0	30	29	24	24	24	PA
Canal Zone	1948	II.66	1,432	100.0	21	2	2	2	-	EV

* A = Program in operation; E = A. Aegypti declared eradicated; N = Negative; P = Positive; V = Under vigilance; r = Revised data; - = Nil or no change; ... = No data available.

STATUS OF THE AEDES AEGYPTI ERADICATION CAMPAIGN MARCH 1966



* ERADICATION CARRIED OUT ACCORDING TO THE STANDARDS ESTABLISHED BY THE PAN AMERICAN HEALTH ORGANIZATION