

DENGUE AND URBANIZATION IN
FRENCH POLYNESIA*

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Abstract: Dengue, contrary to previous belief, is apparently, on the basis of Tahitian research, linked to urbanization rather than to climatic conditions (amount of rain). Native mosquitoes appear to be displaced by *Aedes aegypti* (the vector for dengue) in urban centers where artificial breeding places are quite numerous. Communities progressively more distant from urban centers (and likely to have fewer artificial breeding places in consequence) possess fewer *Aedes aegypti* mosquitoes and show a lower incidence or absence of dengue.

At the time of the dengue epidemic that swept through French Polynesia in May 1971, the occurrence of cases of dengue showed extreme variation from one place to another. Certain archipelagos, such as the Marquesas, were not touched, and even certain areas in Tahiti were but slightly affected. Thus, in Papeete, two persons out of three were affected by the disease, as against one out of three in the country areas far from Papeete.

These observations favor the hypothesis that dengue is transmitted by a mosquito closely bound up with man (*Aedes aegypti*). Actually, this species develops in artificial breeding places and abounds in urban areas to the detriment of the endemic mosquitoes.

Until 1960, *Aedes aegypti* was found only in the Papeete port area, but now it is spreading outward toward the periphery of the urban area. As one moves farther from urban clustering (Figure 1) the introduced *Aedes aegypti* are found in smaller numbers and *Aedes polynesiensis*, a native species, are more numerous. Tests taken around the island show that the ratio of *Aedes aegypti* to *Aedes*

*The remarks summarized here were part of an extensive slide presentation.

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Fonds de Recherche
Bibliothèque

N° : 1690

Cote B

Date : 29 JUL. 1982

B 1690

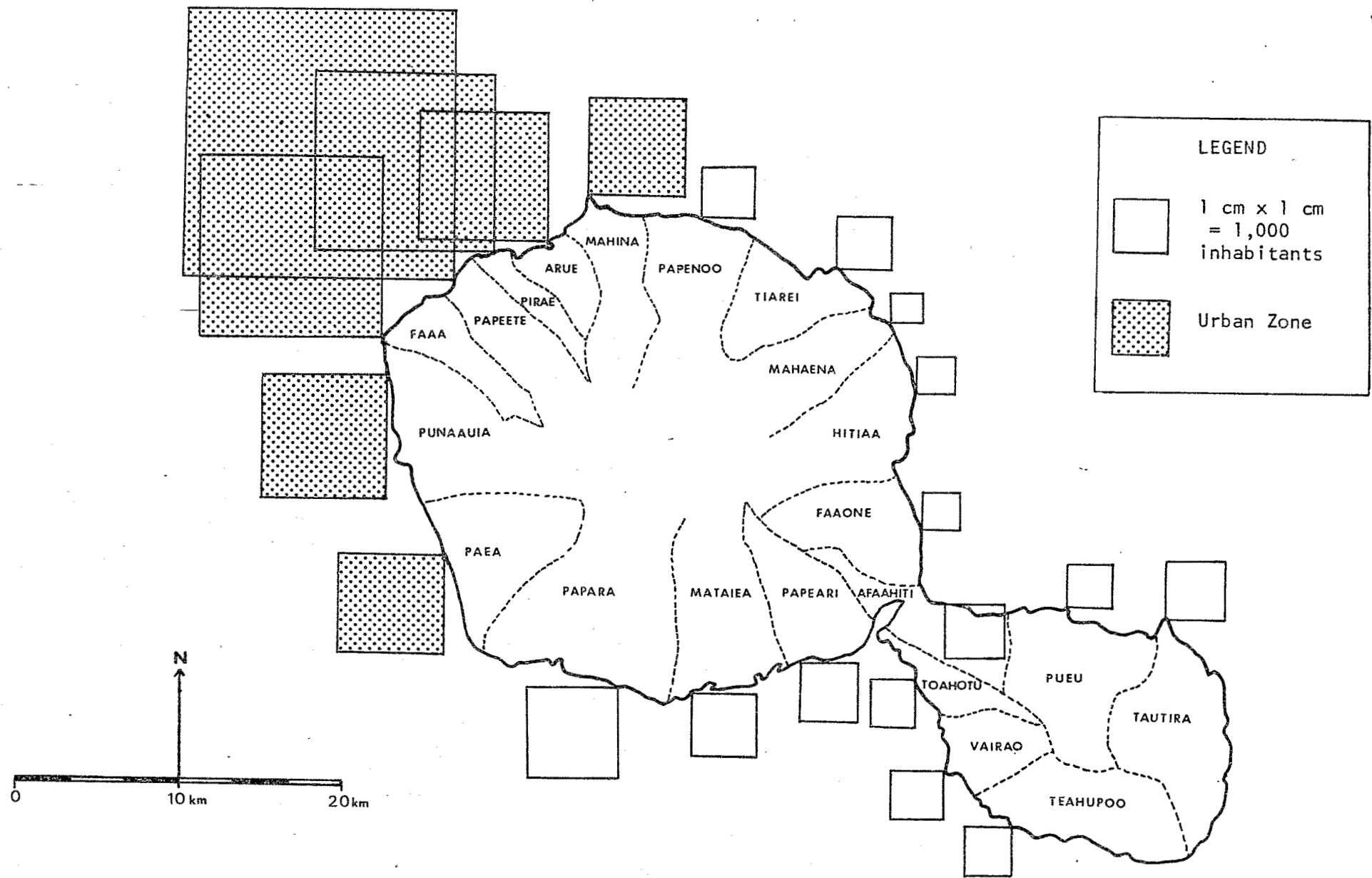


Fig. 1. DISTRIBUTION OF POPULATION IN TAHITI.

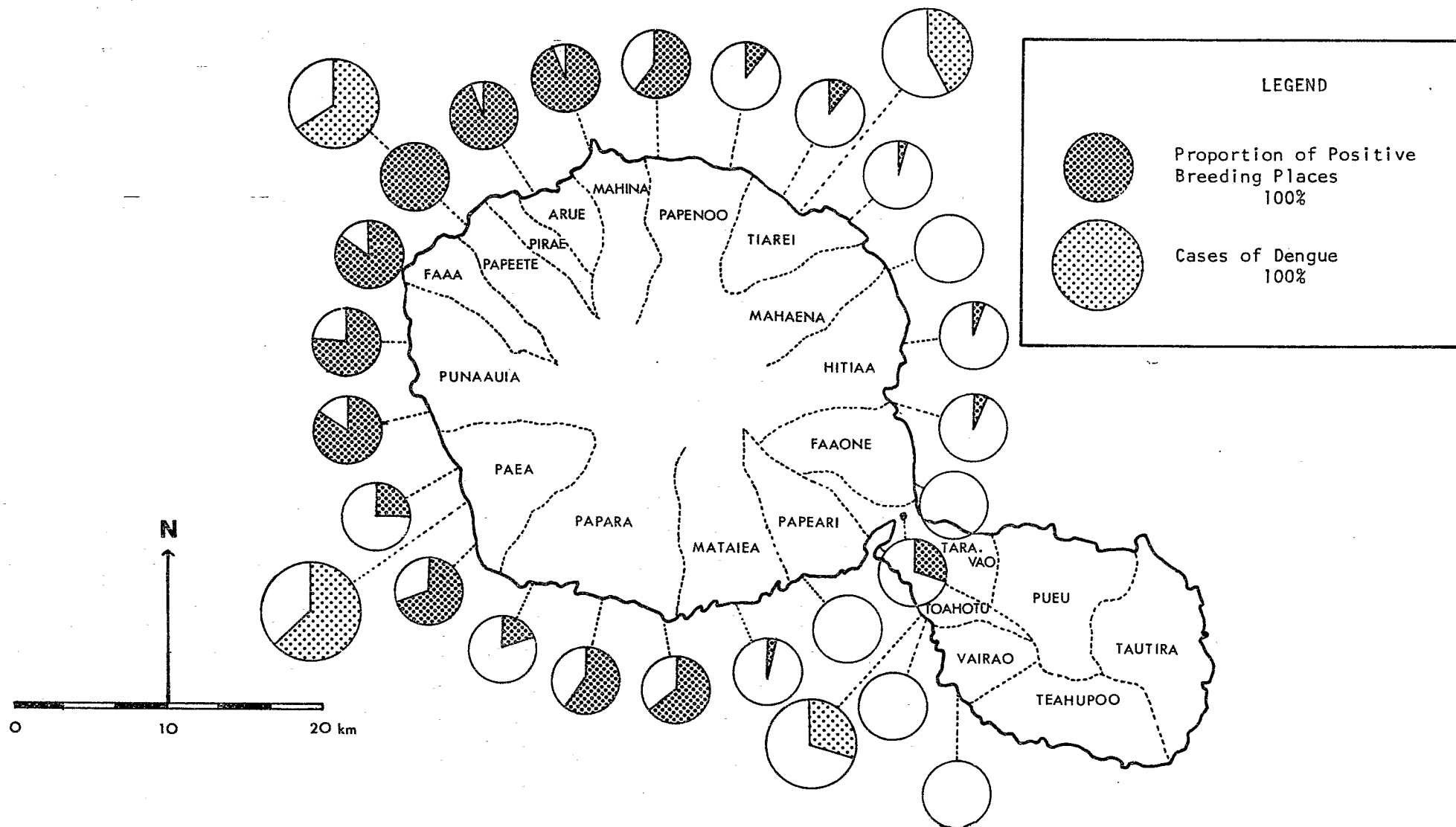


Fig. 2. PROPORTION OF BREEDING PLACES POSITIVE FOR *Aedes Aegypti* AND THE INCIDENCE OF DENGUE.

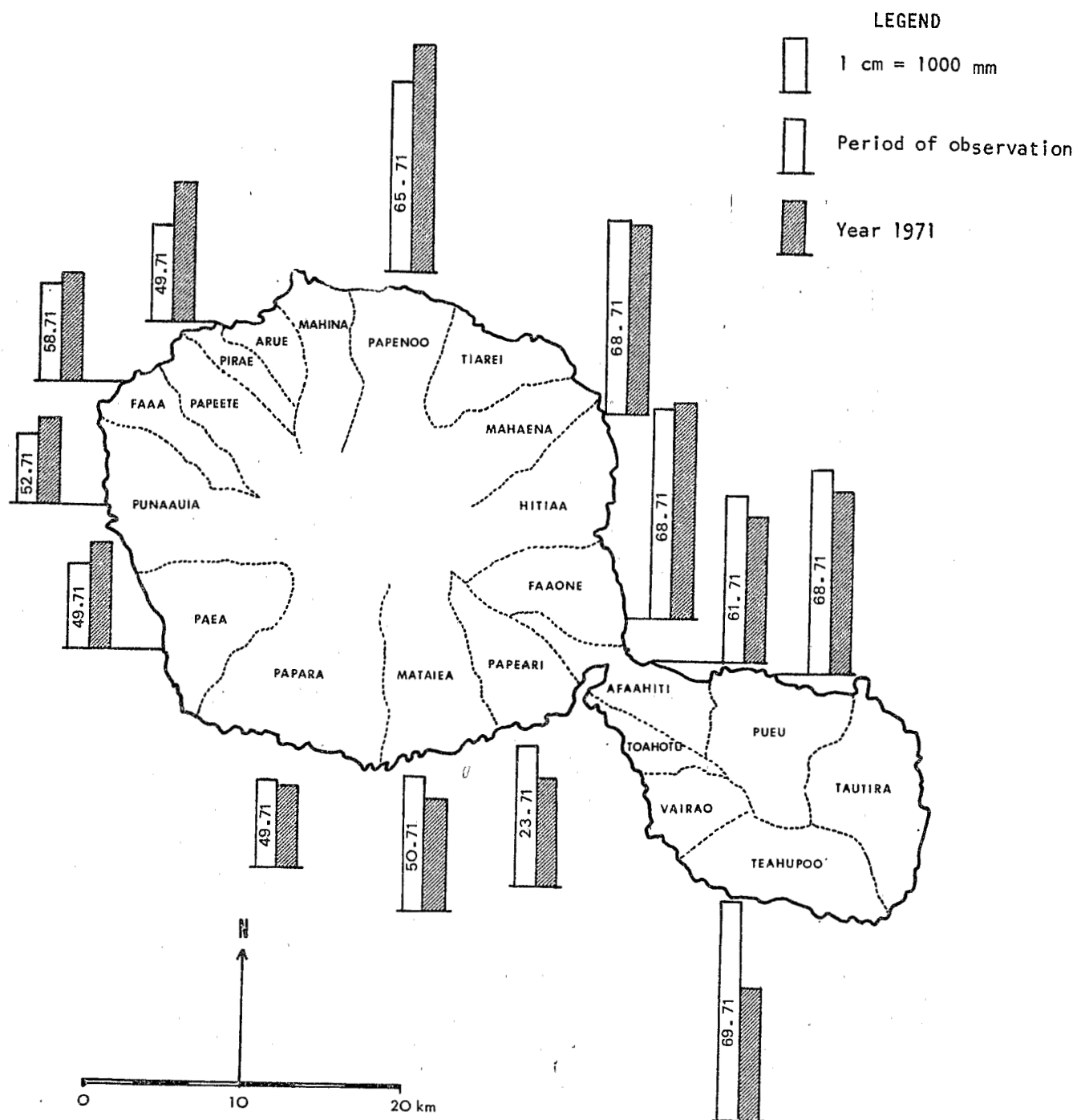


Fig. 3. RAINFALL IN TAHITI.

polynesiensis mosquitoes is proportional to the density of human population rather than to climatic conditions (Figure 2). They are few in number, for example, on the east coast of Tahiti, where it is very rainy, but only sparsely peopled (Figure 3).

During the epidemic persons who did not leave the areas where *Aedes aegypti* are either few or absent were not affected by the dengue, in spite of the virus having been brought in by persons having contracted it in the urban area, and the abundance of native mosquitoes at that time.

Thus, it seems clear that the transmission of dengue is facilitated by urbanization and connected with both the increase in the density of human population (especially in the unhealthy and overpopulated sections of "shanty towns") and the intensification of human relationships, communications, and traffic between city and country on the one hand, and between Tahiti and foreign islands on the other. Owing to the present level of urbanization and its expected future expansion in French Polynesia, it is feared that the state of affairs will worsen.

DISCUSSION EXCERPTS

Dr. Jane H. Underwood (Principal Invited Discussant), University of Arizona, Tucson. Dr. Underwood made reference to a paper by Frank Livingston which included the contention that in Africa it was not merely the increase in human population density that was responsible for malarial spread, but also the spread of agriculture (which made the increase in population density possible) which opened up new breeding places to the *Aedes* mosquito. Urbanization in the Pacific appears to have a similar effect.

Dr. J. A. R. Miles, University of Otago, Dunedin. Dr. Miles felt that one thing that was particularly emphasized throughout Pichon's presentation was the problem of inadequate urban organization, his particular point being the number of places in an urban context where mosquitoes can breed. One could equally well

mention all the places where rats can breed and note their increasing numbers. The major disease problems which face us in the Pacific arise from inadequate urban preparation, inadequate urban facilities, and inadequate environmental sanitation.