

AN ENTOMOLOGICAL SURVEY ON THE MOSQUITOES OF WUVULU ISLAND, PAPUA-NEW GUINEA

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INTRODUCTION

An epidemiological survey on arboviruses was carried out on Wuvulu Island, in August 1975 and 1976.

Wuvulu (or Matty) Island is located 142 miles north of Wewak, in the Sepik district of New Guinea, 260 miles west of Manus Island (Bismarck archipelago) and more than 600 miles south of Caroline Island. Thus, it is a very remote, coralline and small size island (3,700 acres).

The climate is of oceanic type : the average temperature is between 70° and 95°F; the trade winds, whose force is always moderate, blow north-westward from June to September and south-eastward from November to February ; the annual rainfall is between 80 and 120 inches quite evenly distributed throughout the year. The vegetation is a very dense primary forest, rich in epiphytes, cleared in some places for coconut palm plantation.

The islanders (about 500), of Micronesian origin and culture, are distributed in two villages, Auna (sunrise) and Onne (sunset), settled on the west coast where they are two miles apart. Traditionally, they live from their fishing and grow taros, coconuts and sweet potatoes. Work on the plantation is done by a small group of Melanesians from the West Sepik district, living apart from both villages so they have but few contacts with the native population (Gaxotte, 1975).

MATERIALS AND METHODS

The culicids were collected at larval and adult stages. Thus, all detected potential breeding sites have been prospected; some of them were natural (swamp in the center of the island, tree holes, coconuts, shells), others were artificial (drums for water stocking). All adult mosquitoes were caught while biting man, generally near the villages or around the expedition campus.

All the collected mosquitoes were brought back to Paris to be identified.

RESULTS

Six culicid species are present in this collection, but, one of them, the identification is doubtful. So the list of Wuvulu mosquitoes is as follows :

Aedes (Stegomyia) hebrideus Edwards

Aedes (Finlaya) notoscriptus (Skuse)

Aedes (Verrallina) lineatus (Taylor)

? *Aedes (Lorrainea) dasyorrhus* King & Hoogstraal

Culex pipiens fatigans Wiedemann

Armigeres breinli (Taylor)

Aedes (S.) hebrideus : Numerous larvae and pupae collected in tree holes, coconuts, shells; adults biting man, in the late afternoon. This species, which belongs to the *scutellaris* group of *Stegomyia*, develops very often in domestic breeding sites and is usually very aggressive for man. It is known from New Hebrides where it is very abundant (Rodhain and Fauran, 1975), Solomon Is-

lands, Santa Cruz and Torres Islands but Belkin (1965) have yet recorded it in Wuvulu in 1956.

The part played by *Ae. hebrideus* in the transmission of the dengue virus, suspected by Daggy (1944), seems likely according to the observations made in Espiritu Santo Island (New Hebrides), where, *Ae. aegypti* being absent, successive outbreaks are easily spread.

Aedes (F.) notoscriptus : Larvae and pupae in tree holes and in metallic drum in Onne and Auna. The larval ecology of this *Aedes* can be compared to the bionomics of the earlier mosquito. On the other hand, the adults are not anthropophilic, and this fact is confirmed by their absence in our collections. This species is known from a large area in the South Pacific (Australia, New Zealand, New Guinea, New Britain, New Ireland, Moluccas, Neo-Caledonian archipelago) and reported in the collection studied by Belkin (1965). It probably has no medical significance.

Aedes (V.) lineatus : Females collected on man in the whole island at the end of afternoon, in rather large numbers. This *Aedes*, of which the larvae usually breed in pools with abundant vegetation or in flooded forests (Huang, 1968) seems to be a man-biting mosquito in all its distribution area, with the largest of those of *Verrallina*: Solomon Islands, New Britain, New Ireland, Bismarck archipelago, New Guinea, Admiralty Islands, Ceram, Amboine, Australia and New Hebrides where Rageau and Vervent (1958), then Rodhain and Fauran (1975) drew attention to its abundance in forest and its aggressivity for man.

Aedes (L.) dasyorrrhus : Only one female in rather bad condition seems to belong to this species, which is known in New Guinea and Solomon Islands.

Culex pipiens fatigans : Many larvae collected in drums in Auna village and one female.

This species was yet known from Wuvulu (Belkin, 1965).

Armigeres breinli : Larvae collected in shells ; adult females caught on man in the whole island. Shells are classical breeding sites for the larvae of this mosquito. This species is known to bite man during daytime in the bush (Belkin, 1962). Its distribution covers New Guinea, Bismarck archipelago, Santa Cruz and Solomon Islands. It has no medical significance.

DISCUSSION

When, in 1956, David D. Bonnot made a very brief survey on Wuvulu Island, four species have been collected (Belkin, 1965) viz: *Aedes notoscriptus*, *Ae. hebrideus*, *Culex squamosus* and *C. pipiens fatigans*.

These two *Aedes* species have so been found again in 1975, with *Ae. lineatus* probably introduced since this date, and perhaps *Ae. dasyorrrhus*. This survey affirms the absence of *Ae. aegypti* actually. As far as *Culex* is concerned, only *C. pipiens fatigans* is still present in the island. However, this species is certainly the first to be exposed to the anticulicid measures which are carried out from time to time. *A. breinli* lastly, probably introduced, seems to have taken root in Wuvulu Island.

No *Anopheles* species have ever been observed in the island where malaria is present. However, *Anopheles* larvae are probably present in the swampy central area and they could have escaped from the surveys.

Concerning the medical importance of these mosquitoes, only *Ae. hebrideus* could be an efficient dengue vector. The serological survey made in the islanders (Micronesian islanders and New-Guinean Melanesian imported workers) shows that dengue outbreaks which spread over South Pacific did not reach Wuvulu Island (Gaxotte *et al.*, 1975). The

virus introduction anyway is still always possible, like it happened in New Britain or in Sepik district (New Guinea) in 1971-1972. Except for *C. p. fatigans*, no recorded culicid could be an efficient vector of bancroftian filariasis, the presence of which was shown by Backhouse and Heydon (1950).

SUMMARY

An entomological survey in Wuvulu Island, Papua New Guinea, in August 1975 and 1976 shows the presence of six mosquito species : *Aedes (S.) hebrideus*, *Ae. (F.) notoscriptus*, *Ae. (V.) lineatus*, ? *Ae. (L.) dasyorrrhus*, *Culex pipiens fatigans* and *Armigeres breinli*. The medical significance of these mosquitoes is discussed, with special reference to the problem of dengue virus transmission.

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