

## DISCOVERY OF *Aedes albopictus* IN GUATEMALA<sup>1</sup>

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**ABSTRACT.** *Aedes albopictus* was discovered for the first time in Guatemala during June 1995. It was collected in 10 out of 15 localities sampled in and around the community of Puerto Barrios in the Department of Izabal. The location of the positive collections indicates a more rural distribution than *Aedes aegypti*. Sampling was conducted along the Atlantic Highway up to the capital city to determine the extent of its introduction into the country. Larvae were not found more than 4 km outside of Puerto Barrios. The principal breeding places were rubber tires, glass bottles, and metal drums.

*Aedes albopictus* (Skuse) is of Asiatic origin and is commonly found in Southeast Asia and the western Pacific area. In 1985, adults and larvae were collected in and around the city of Houston, TX, USA (Sprenger and Wuithiranyagool 1986) and the species has since spread to 23 other states in the USA (Moore et al. 1988, Estrado-Franco and Craig 1995). *Aedes albopictus* is now established in 7 states in Brazil, in Santo Domingo, Dominican Republic, and in northern areas of Mexico along the U.S. border (Ibañez-Bernal and Martínez-Campos 1994, Estrado-Franco and Craig 1995). Hawley (1988) suggested that the reduced ability to disperse below 28°N was due to the photoperiod adaptation of the *Ae. albopictus* strain introduced into the United States, but now it is evident that this species will probably continue its expansion southward (O'Meara et al. 1993).

In Guatemala no systematic search had been undertaken to detect the immigration of *Ae. albopictus*. With this objective a preliminary survey was undertaken at several border entrances into Guatemala.

Surveys were conducted in Puerto Barrios, Puerto Quetzal, and Tecun Umán, the principal border entrances to Guatemala. The Port of Santo Tomas de Castilla is located on the outskirts of Puerto Barrios and is the main seaport to the United States via the Caribbean Sea (15°41'N, 88°38'W). Tecun Umán is along the main crossing route between Mexico and Guatemala. Puerto Quetzal is the only operating seaport on the Pacific Ocean side of Guatemala.

Preliminary surveillance consisted of sampling 30 houses in each locality. The survey consisted of searching for containers with water,

and recording their type and location and the collection of mosquito larvae and pupae. About 5 larvae and pupae from each container were taken to the laboratory for identification. After the initial discovery of *Ae. albopictus* in the Puerto Barrios area, 3 more visits were made to determine the extent of the invasion and to make human bait collections to obtain adults. In the laboratory, the larvae and pupae collected were reared to the adult stage for specific identification.

To determine the extent of *Ae. albopictus* along the Atlantic Highway from Puerto Barrios to Guatemala City (the distance is 297 km), 12 localities were surveyed based upon their geographical location and importance as truck stops. From 5 to 10 houses were sampled in the 6 localities located less than 16 km from San Manuel, the exit of Puerto Barrios City. Only roadside tire repair shops were sampled in the remaining 6 localities, which were located more than 26 km from Puerto Barrios.

*Aedes albopictus* and the other mosquito species were identified using the keys and the morphological descriptions by Tanaka et al. (1979), Clark-gil and Darsie (1983), Darsie (1986), and Tsuzuki et al. (1989) and comparison with specimens of *Ae. albopictus* from Japan.

From June to October 1995, 184 houses were sampled and 10 species of mosquitoes, including 3 undetermined species, were collected in Puerto Barrios (Table 1). Larvae and pupae of *Ae. albopictus* were collected from many kinds of water containers in the Colonia San Andres in Port of Santo Tomas de Castilla, Puerto Barrios City, Department of Izabal, Guatemala, on June 22, 1995. This is the first record of this species in Guatemala and in Central America. *Aedes aegypti* (Linn.) was most commonly collected followed by *Ae. albopictus*, *Limatus durhamii* Theobald, *Culex coronator* Dyar and Knab, *Cx. quinquefasciatus* Say, *Cx. inflicus* (Theobald), *Cx. thriambus* Dyar, and the 3 unidentified species.

Upon discovering *Ae. albopictus*, a survey was conducted in 15 localities within the municipality of Puerto Barrios. The location of the

<sup>1</sup> This study was accomplished as a part of "Project of Investigation of Tropical Diseases" under the Technical Cooperation between Guatemala and Japan. GJET-70.

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Table 1. Mosquito species captured and identified in Puerto Barrios in 1995.

Species	No. of larvae	No. of pupae
<i>Aedes aegypti</i>	929	59
<i>Aedes albopictus</i>	268	18
<i>Limatus durhamii</i>	163	13
<i>Culex coronator</i>	65	11
<i>Culex quinquefasciatus</i>	45	0
<i>Culex infictus</i>	7	0
<i>Culex thriambus</i>	1	1
<i>Culex</i> sp. 1	11	0
<i>Culex</i> sp. 2	4	1
<i>Anopheles</i> sp. 1	1	0

communities and results are shown in Fig. 1 and Table 2. The collectors attempted to find as many larvae and pupae of *Aedes* as possible. Of the 15 localities, 10 were positive for *Ae. albopictus*, and 9 were positive for *Ae. aegypti*. *Aedes albopictus* appears to occupy a slightly different niche, which overlaps in part with *Ae. aegypti*. As shown in Table 2, *Ae. albopictus* was more common than *Ae. aegypti* in the rural area. In contrast, *Ae. aegypti* was more common in the urban area. *Aedes albopictus* was the only species in 26 containers (36.6% of the *Ae. albopictus*-positive containers), but coexisted with

*Ae. aegypti*, *Li. durhamii*, *Cx. coronator*, *Cx. quinquefasciatus*, and the other *Culex* spp. in 45 containers (63.4%).

More than 50% of the containers with *Ae. albopictus* ( $n = 71$ ) were discarded tires, followed by broken glass bottles (14.1%), metal drums (9.9%), and discarded plastic containers (8.5%). About 83% of the positive containers could be classified as discarded (Table 3). In Guatemala the principal larval habitats for *Ae. aegypti* are metal drums and cement sinks with tank in the dry season and rubber tires, metal drums, and cement sinks with tank in the rainy season (Ogata et al. 1996). This preliminary study indicated that *Ae. albopictus* is found more often in discarded containers than is *Ae. aegypti*.

Five adult females of *Ae. albopictus* were captured by a human bait collection during 30 min in the evening of September 20, 1995, in Escobas, Puerto Barrios.

It was suspected that *Ae. albopictus* may disperse to the capital of Guatemala via the Atlantic Highway in rubber tires, which are frequently infested by this species. Sampling along the highway indicated that *Ae. albopictus* had dispersed only 4 km from the starting point of the highway, San Manuel.

As of October 1995, *Ae. albopictus* had spread within the city of Puerto Barrios. The northern part of the city is bordered by the Bay

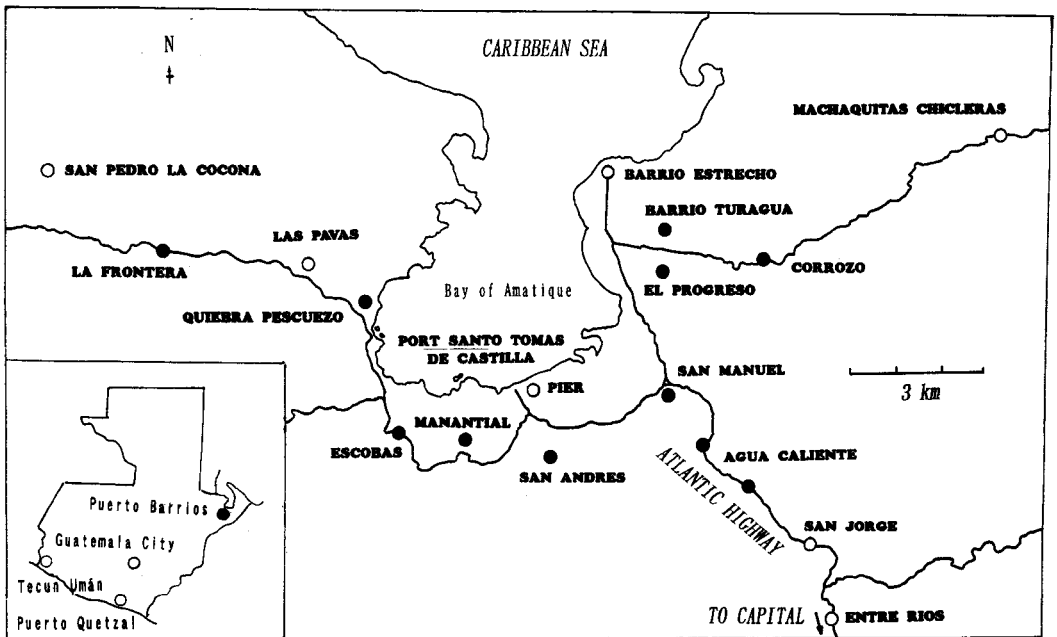


Fig. 1. Distribution of *Aedes albopictus* in Puerto Barrios, 1995. ●: Positive for *Ae. albopictus*; ○: negative for *Ae. albopictus*.

Table 2. Distribution of containers positive for *Aedes albopictus* and *Aedes aegypti* encountered in Puerto Barrios in 1995.

Localities	No. of houses examined	No. containers positive for	
		<i>Ae. albopictus</i>	<i>Ae. aegypti</i>
<b>Rural</b>			
Machaquitas Chicleras	6	0	0
San Pedro Cocona	6	0	0
La Frontera	10	2	0
Las Pavas	10	0	0
Quebra Pescuezo	6	1	3
Escobas	7	22	0
Manantial	10	1	0
Corrozo	23	2	1
Total	78	28	4
<b>Suburban</b>			
San Andres	30	10	16
El Progreso	30	6	28
Barrio Turagua	17	3	27
Barrio Estrecho	10	0	8
Agua Caliente	12	19	23
Total	99	38	102
<b>Urban</b>			
San Manuel	5	5	10
Pier of Port	2	0	12
Total	7	5	22

of Amatique, which is part of the Caribbean Sea. To the east and west are rural areas with few houses and villages and infrequent traffic. It is possible that *Ae. albopictus* may spread slowly through this area. To the south of Puerto Barrios is a hilly area where there are few houses but the traffic is heavier because it is the only road to Guatemala City. *Aedes albopictus* is well established in the area and may pose a threat to the rest of Guatemala. Other than in the Puerto Barrios area no *Ae. albopictus* were observed in the other major entry points into Guatemala such as Tecun Umán or Puerto Quetzal or in the other areas within Guatemala.

Specimens of adults, pupae, and larvae collected in Puerto Barrios are deposited in Department of Biology, Faculty of Chemistry and Pharmacy, University of San Carlos of Guatemala.

We express our appreciation to Japan International Cooperation Agency (JICA) and Ministry of Public Health of Guatemala and also thanks to Victor Barrios, Ileana Eckstein, and Onofre Ochoa for their technical assistance, Ikuo Tanaka for his illustration of the map, and Chris Frederickson for his kind revision of the manuscript.

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Table 3. Containers positive for *Aedes albopictus* and *Aedes aegypti* observed at 184 houses in Puerto Barrios, 1995.

Habitat	<i>Ae. albopictus</i>		<i>Ae. aegypti</i>	
	No.	%	No.	%
Rubber tires	37	52.1	38	32.5
Broken glass bottles	10	14.1	4	3.4
Metal drums	7	9.9	25	21.4
Discarded plastic containers	6	8.5	10	8.5
Discarded utensils	3	4.2	6	5.1
Discarded tin cans	2	2.8	4	3.4
Animal troughs	2	2.8	4	3.4
Cement sinks with tank	1	1.4	12	10.3
Cement tanks	1	1.4	5	4.3
Flower pots	1	1.4	6	5.1
Coconut shells	1	1.4	0	0
Surface water on lid of drums	0	0	3	2.6
Total	71		117	

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