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First report of *Aedes (Stegomyia) albopictus* in the state of Ceará, Brazil

ABSTRACT

For the first time, the occurrence of *Aedes (Stegomyia) albopictus* in an urban area of the city of Fortaleza, Northeastern Brazil, is reported. From January to July 2005, ovitraps were used to collect eggs from *Aedes* spp., which were kept under laboratory conditions to develop into the adult phase. The resultant mosquitoes were identified and subjected to dengue virus isolation tests. Thirteen specimens of *Aedes albopictus*, all females, were identified. No dengue virus was isolated in any of the mosquito pools. Even though *Aedes albopictus* has not been incriminated in Brazilian dengue outbreaks, the possibility of dengue virus transmission by these mosquitoes cannot be dismissed.

KEYWORDS: *Aedes albopictus*. Dengue virus, isolation & purification.

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INTRODUCTION

The first records of *Aedes albopictus* in Brazil date from the year 1986, in the states of Rio de Janeiro and Minas Gerais. There is speculation that it entered Brazilian territory as a consequence of maritime trade in iron ore with Japan.¹ Since then, its growth and accelerating expansion has been observed. There are only six Brazilian states that have not yet recorded infestation with this species: Amapá, Roraima, Acre, Tocantins, Piauí and Sergipe.⁴

The mosquito *Aedes albopictus* is an allochthonous species on the American continent and it originated from Asia, where it acts as a secondary vector for the dengue virus, in rural and urban areas, and for the Japanese encephalitis virus.⁵ Under laboratory conditions, it has been shown to be capable of being infected by and transmitting 22 arboviruses,² which makes it epidemiologically important to record its occurrence.

Therefore, because of the potential that this mosquito has for transmitting the dengue virus, the present work had the objective of notifying the first records of *Aedes albopictus* in an urban area of the city of Fortaleza, State of Ceará, Brazil.

METHODS

From January to July 2005, during routine field activities within the dengue control program, eggs of *Aedes* spp. were collected from districts within the metropolitan region of Fortaleza, State of Ceará. The districts of Aldeota, Antônio Bezerra, Genibaú,

Montese, Praia de Iracema and Vila Velha were chosen because of the high rates of infestation in buildings. These collections had the aim of isolating the serotypes of the dengue virus that were circulating in the populations of *Aedes aegypti*, in an attempt to make consistent inferences regarding the transovarian transmission of these viruses under natural conditions and the natural maintenance of these viruses during interepidemic periods in the city of Fortaleza.

Eighty ovitraps were installed in each district, distributed among ten homes visited, in such a way that, for each home, four ovitraps were kept in environments within the home, while another four were kept in environments surrounding the home, for a five-day period. Following this period, the ovitraps were collected and the eggs collected were left to hatch on the premises of the entomology laboratory of the *Núcleo de Endemias Transmissíveis por Vetores* (NUEND - Center for Vector-Transmittable Endemics), of the State Health Department of Ceará (SESA-CE).

The resultant adults were sent to the Evandro Chagas Institute, in Belém, Pará, for identification of the specimens and isolation of the dengue viruses. The mosquitoes were divided into 24 pools containing between 8 and 35 mosquitoes, as shown in the Table. These samples were macerated and inoculated into a culture of C6/36 cells from *Aedes albopictus*, and incubated for 12 days at room temperature ($\pm 25^{\circ}\text{C}$). Non-inoculated cells and cells inoculated with the DENV-1 serotype were utilized as negative and positive controls, respectively. After this period, aliquots of the cell suspensions were subjected to indirect immunofluorescence tests and PCR, to investigate the presence of dengue viruses.³

RESULTS

In total, 529 mosquitoes were identified, of which 516 were *Aedes aegypti* (238 males and 278 females) and 13 were *Aedes albopictus* (all female), and the latter all came from the Montese district (Table). The environments from which these females were collected were both inside the home (office and bathroom) and in the area surrounding the home (an old tire and a henhouse).

None of the pools revealed infection by dengue viruses.

DISCUSSION

Although there have been reports of the presence of *Aedes albopictus* from most Brazilian states, it has still not been incriminated with regard to dengue outbreaks in this country. However, its increasing

Table - Identification of the captured samples of *Aedes* spp. Fortaleza, Ceará, January to July 2005.

Locality	Quantity	Species
Aldeota	22	<i>Ae. (Stg.) aegypti</i> female
	22	<i>Ae. (Stg.) aegypti</i> female
Antônio Bezerra	35	<i>Ae. (Stg.) aegypti</i> female
	16	<i>Ae. (Stg.) aegypti</i> male
Genibaú	23	<i>Ae. (Stg.) aegypti</i> female
	22	<i>Ae. (Stg.) aegypti</i> female
	29	<i>Ae. (Stg.) aegypti</i> male
	29	<i>Ae. (Stg.) aegypti</i> male
Montese	19	<i>Ae. (Stg.) aegypti</i> female
	19	<i>Ae. (Stg.) aegypti</i> female
	22	<i>Ae. (Stg.) aegypti</i> female
	23	<i>Ae. (Stg.) aegypti</i> female
	14	<i>Ae. (Stg.) aegypti</i> female
	30	<i>Ae. (Stg.) aegypti</i> male
	30	<i>Ae. (Stg.) aegypti</i> male
	16	<i>Ae. (Stg.) aegypti</i> male
Praia de Iracema	25	<i>Ae. (Stg.) aegypti</i> male
	30	<i>Ae. (Stg.) aegypti</i> male
	13	<i>Ae. (Stg.) albopictus</i> female
	18	<i>Ae. (Stg.) aegypti</i> female
	17	<i>Ae. (Stg.) aegypti</i> female
Vila Velha	25	<i>Ae. (Stg.) aegypti</i> male
	22	<i>Ae. (Stg.) aegypti</i> female
	8	<i>Ae. (Stg.) aegypti</i> male

adaptation to the urban environment makes it a potential vector for dengue viruses in human populations. Moreover, it needs to be considered that there could be genetic diversity in the populations of *Aedes albopictus* across the national territory, and in the strains of the dengue viruses, and that these factors might have an influence on the parasite-host relationships established.

The recording of specimens of *Aedes albopictus* only in the Montese district does not mean that the possibility of observing its presence in other districts can be dismissed, since these other districts share the favorable environmental conditions for this mosquito to settle and procreate. Considering that this species has a predominantly wild nature, the fact that its presence was recorded in environments within the home and surrounding the home demonstrate its real adaptation to the urban environment. The district in which

this species was found does not seem to have any peculiar characteristic that would differentiate it from the other districts in the city.

It is believed that the arrival of *Aedes albopictus* in Ceará has been favored by the constant intense traffic of people and goods coming from a wide diversity of regions of the country. The fact that the samples analyzed did not show evidence of infection by the dengue viruses may be related to the small quantity of mosquitoes available for the tests.

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The collection and maintenance of the immature forms of the culicids captured was done at the Entomology Laboratory of the Center for Vector-Transmittable Endemics; the identification of the culicids and tests to isolate viruses were carried out in the Arbovirology Sector of the Instituto Evandro Chagas.