

Expansion of *Aedes albopictus* skull in Costa Rica

CALDERÓN-ARGUEDAS O.¹, AVENDAÑO A.¹, LÓPEZ-SÁNCHEZ W.¹ y TROYO A.¹

¹ Centro de Investigación en Enfermedades Tropicales (CIET). Section of Medical Entomology. Department of Parasitology, School of Microbiology, University of Costa Rica.

ABSTRACT

A report of the *Aedes albopictus* expansion in Costa Rica is described as well as its epidemiological analysis.

Key words: *Aedes albopictus*, *Aedes aegypti*, dengue virus, Culicidae, Central America, Costa Rica.

RESUMEN

Un informe de la expansión del *Aedes albopictus* in Costa Rica se presenta y también se hace un análisis de la importancia epidemiológica. Se confirma la expansión del mosquito en el territorio Centro Americano

Palabras clave: *Aedes albopictus*, *Aedes aegypti*, virus dengue virus, Culicidae, América Central, Costa Rica.

REPORT

The “tiger mosquito”, *Aedes albopictus* is one of the primary vectors of dengue virus (Rai, 1991). It is also an efficient vector for other arboviruses like Chickungunya, Japanese Encephalitis, San Angelo and La Crosse (Rai, 1991) and has been associated with the transmission of the nematode *Dirofilaria immitis* (Chapellapha y Chellapha 1968). Although there are recent reports of West Nile virus detection in *A. albopictus* (Holick *et al.*, 2002), its role in the transmission of this virus requires further study.

Dengue is the main vector-borne disease in Costa Rica in terms of morbidity and mortality (Troyo

et al., 2006). From the re-introduction of *Aedes aegypti* in 1993 and until 2008, there were 189,316 cases of dengue fever (DF) reported (Ministerio de Salud, 2010). Within the country, this infectious disease affects mainly the North Pacific, Central Pacific and Caribbean regions where the only vector confirmed has been *A. aegypti* Linnaeus (Ministerio de Salud, 2010).

In October 1998, a newspaper report in Costa Rica reported possible presence of *A. albopictus* in the district La Virgen, Province of Heredia located in the North of the Country, but it was only until March of 2009 that the Ministry of Health alerted the national press as to the presence of *A. albopictus*

Received: 20 de Julio de 2010. Accepted: 15 de Octubre 2010.

Corresponding: Olger Calderón-Arguedas

E-mail: olger.calderon@ucr.ac.cr

in localities of the Northern Caribbean Region. This study, based in larval surveys, demonstrated the presence of *A. albopictus* in coconut shells in Siquirres county, Province of Limon Marin et al, 2009).

Here we describe the finding of adult specimens of *A. albopictus* collected in the district Pital of San Carlos county, Province of Alajuela, in the North of the country. Two adult female mosquitoes were collected using human bait and transported to the Laboratory of Medical Entomology, University of Costa Rica for identification. The observation of the specimens was made with a stereoscopic microscope, and identification was performed according the criteria specified in the keys of Rueda (2004), Darsey (Darsey, 1988) and (SUCAM, 1989). The most important diagnostic characteristics are pre-

sented in Figure 1.

This report of *A. albopictus* in Costa Rica confirms the expansion of this mosquito in the Central American territory, where recently Guatemala, El Salvador, Honduras and Nicaragua have reported the presence of this vector Cuellar *et al.*, 2007; DelC-Lugo *et al.*, 2005). The United States of America was the first country of the Americas to report *A. albopictus*, and in this case its introduction was linked to the import of rubber tires from Southeast Asia (Rai, 1991). The same situation was proposed in Brazil and Colombia (Rai, 1991; Cuellar *et al.*, 2007). In the case of Costa Rica, the reports of *A. albopictus* in the Caribbean and now in the North of the country suggest that the distribution of this mosquito could be related to the simple territorial expansion through continental territory of



Figure 1. Main diagnostic characteristics. **a:** narrow white medial longitudinal stripe on the scutum. **b:** White and complete transverse bands on the anterior part of abdominal terga II-VIII. **c:** white ringed segments of tarsus III where the last tarsal segment has a complete white ringed area. **d:** absence of white scale patches on clypeus. **e:** contiguous white scale patches forming a V-shaped white patch on the mesepimeron.

Central America; process favored by this mosquito's capability to use natural and artificial container habitats for oviposition and larval development. In this sense, the City of Leon in the neighbor country of Nicaragua, is one of the major Nicaraguan urban centers that has reported presence of this mosquito (Cuellar *et al.*, 2007).

A. albopictus has been considered the main vector in several dengue outbreaks in the continent (Rai, 1991). In an outbreak described in Tamaulipas, México (Ibáñez *et al.*, 2008), transovarial transmission of dengue serotypes 2 and 3 was demonstrated. These characteristics increase the complexity of the dengue epidemiology, especially in areas such as Costa Rica where *A. albopictus* may coexist with the main vector, *A. aegypti*.

REFERENCES

1. CHAPPELLA WT, CHELLAPHA GR JR. 1968. Susceptibility of four common Singapore mosquitoes to *Dirofilaria immitis* Leidy. *J Med Entomol* 5: 358-361.
2. CUÉLLAR ME, VELÁSQUEZ ESCOBAR OL, GONZÁLEZ-OBANDO R, MORALES-REICHMANN CA. 2007. Detección de *Aedes albopictus* (Skuse) (Diptera: Culicidae) en la Ciudad de Cali, Valle del Cauca, Colombia. *Biomédica* 27: 273-279.
3. DARSEY RF. 1988. A taxonomic separation of *Aedes albopictus* from mosquitoes in the Greater Antilles of the Caribbean Area (Diptera, Culicidae). *Mosq Sys* 20: 357-369.
4. DEL C-LUGO E, MORENO G, ZACHARIAH MA, LÓPEZ MM, LÓPEZ JD, DELGADO MA, VALLE SI, ESPINOZA PM, SALGADO, MJ, PÉREZ R, HAMMOND SN, HARRIS E. 2005. Identification of *Aedes albopictus* in urban Nicaragua. *J Am Mosq Control Assoc* 21: 325-327.
5. HOLICK J, KYLE A, FERRARO W, DELANEY R, IWASEZKO M. 2002. Discovery of *Aedes albopictus* infected with West Nile virus in southeastern Pennsylvania. *J Am Mosq Control Assoc* 18: 131.
6. IBÁÑEZ BERNAL S, BRISEÑO B, MUTEBI JP, ARGOT E, RODRÍGUEZ G, MARTÍNEZ CAMPOS C, PAZ R, DE LA FUENTE-SAN ROMÁN P, TAPIA-CONYER R, FLISSER AA. 2008. First record in America of *Ae. albopictus* naturally infected with dengue virus during the 1995 outbreak at Reynosa, México. *Med Vet Entomol* 11: 305-309.
7. MARÍN R, MARQUETTI MC, ÁLVAREZ Y, GUTIÉRREZ JM, GONZÁLEZ R. 2009. Especies de mosquitos (Diptera: Culicidae) y sus sitios de cría en la Región Huetar Atlántica, Costa Rica. *Rev Biomed* 20: 15-23.
8. MINISTERIO DE SALUD. VIGILANCIA DE LA SALUD. 2010. (Cited 2009 November 3). Available at: <http://www.ministeriodesalud.go.cr/index.php/inicio-estadisticas-vigilancia-salud-ms>. Accessed February 5.
9. RAI K. 1991. *Aedes albopictus* in the Americas. *Annu Rev Entomol* 36: 459-484.
10. RUEDA LM. 2004. Pictorial keys for the identification of mosquitoes (Diptera: Culicidae) associated with dengue virus transmission. *Zootaxa* 589: 1-60.
11. SUCAM 1989. (Superintendência de Campanhas de Saúde Pública). Resumo dos principios caracteres morfológicos diferenciais do *Aedes aegypti* e do *Aedes albopictus*. Brasilia: SUCAM/Min. da Saúde.
12. TROYO A, PORCELAIN SL, CALDERÓN-ARGUEDAS O, BEIER JC. 2006. Dengue in Costa Rica: the gap in local scientific research. *Pan Am J Public Health* 20: 350-360.

Acknowledgments. The authors will like to express their gratitude to “Vicerrectoría de Acción Social”, University of Costa Rica for the support to project ED 548.