

## Spread of *Aedes albopictus*<sup>1</sup> in the Yucatan Peninsula, Mexico, from 2011 to 2019

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**Abstract.** Descriptive evidence of *Aedes albopictus* (Skuse) spreading across the Yucatan Peninsula, southeastern Mexico, was provided from a survey of medically important mosquitoes and historical data from 2011 to 2019. The species was reported for the first time at Campeche and 15 new localities of Quintana Roo.

**Resumen.** Se presenta evidencia descriptiva de la distribución de *Aedes albopictus* (Skuse) en la Península de Yucatán, al sureste de México, como resultado de un muestreo entomológico de mosquitos de importancia médica en el área y datos históricos de 2011 a 2019. Asimismo, se reporta por primera vez la presencia de esta especie en Campeche y 15 localidades de Quintana Roo.

The Asian tiger mosquito, *Aedes albopictus* (Skuse), is a secondary vector of dengue. However, it directly transmits the virus when numbers of the primary vector, *Ae. aegypti* L. are suppressed by population control (Delatte et al. 2008). *Ae. albopictus* is found mainly in peri-urban and rural areas, and invasion into new regions is associated with human activity (Hawley et al. 1987, Tatem et al. 2006).

The first record of *Ae. albopictus* in Mexico occurred in the State of Coahuila in 1994 (Ibañez-Bernal and Martínez-Campos 1994, Rodríguez-Tovar and Ortega-Martínez 1994). Since then, the species has been reported in 13 more states: Tamaulipas, Nuevo León, Chiapas, Veracruz, Morelos, Quintana Roo, Sinaloa, Hidalgo, Tabasco, Yucatán, Guerrero, and Mexico City (Ibañez-Bernal et al. 1997; Casas-Martínez and Torres-Estrada 2003; Orta-Pesina et al. 2005; Villegas-Trejo et al. 2010; Salomón-Grajales et al. 2012; Torres-Avenidaño et al. 2015; Ortega-Morales and Siller-Rodríguez 2016; Ortega-Morales et al. 2016, 2018; Contreras-Perera et al. 2019; Dávalos-Becerril et al. 2019; González-Acosta et al. 2019). Most of Mexico has environmental conditions adequate to harbor and potentially promote survival of

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*Ae. albopictus* (Yañez-Arenas et al. 2017). According to genetic data, the species probably was introduced into Mexico from populations in the USA and Central and South America (Pech-May et al. 2016).

We did an entomological survey and reviewed historical data throughout the Yucatan Peninsula (Campeche, Quintana Roo, and Yucatan states) between 2014 and 2019 and found *Ae. albopictus* at 15 localities not previously reported as harboring the species. We also recorded the first incidence of the species in the State of Campeche (Table 1). Sampling was by ovitraps and monitoring larvae and adult female mosquitoes. Adult specimens were identified in the laboratory of the Entomological Investigation and Bioassays Unit of Quintana Roo (UIEB-QROO) and juvenile stages in the Public Health Laboratory of Quintana Roo (LESP-QROO). Morphological analysis and conventional identification keys were used for identification (Ibañez-Bernal and Martínez-Campos 1994, Darsie and Ward 2005).

Table 1. Records of *Aedes albopictus* in the Yucatan Peninsula from 2011 to 2019. The data combine our records and reports from the literature.

Year	State and reported locations per year		
	Quintana Roo	Yucatán	Campeche
2011	Cancún (Salomón-Grajales et al. 2012)	–	–
2014	Isla Mujeres, Rancho Viejo	–	–
2015	Isla Mujeres, Rancho Viejo	–	–
2016	Cancún (Ortega-Morales et al. 2018), Playa del Carmen, Tulum	–	–
2017	Cancún (Ortega-Morales et al. 2018), Felipe Carrillo Puerto (Ortega-Morales et al. 2018), Playa del Carmen, Puerto Aventuras, Tulum (Ortega-Morales et al. 2018)	Tizimín (Ortega-Morales et al. 2018)	–
2018	Cancún, Chetumal, Chumpón, Dzúlá, Felipe Carrillo Puerto, Isla Mujeres, José María Morelos, Kantunilkín, Playa del Carmen, Tulum	San Pedro Noh-Pat (Conterras-Perera et al. 2019)	–
2019	Bacalar, Chetumal, Cozumel, Felipe Carrillo Puerto, Kantunilkín, Pantera, Petcacab, Puerto Morelos, X-Yatil	–	Arroyo Negro

The first reports of *Ae. albopictus* were from northeastern Quintana Roo (2011 to 2015), after which the mosquito was observed at new localities every year. The distribution pattern confirmed the species became established on the Peninsula (Fig. 1). *Ae. albopictus* spread from northeast to southwest and into the interior of the Yucatan Peninsula, although the presence of the species in Belize (Ortega-Morales et al. 2010) and Guatemala (Lepe et al. 2017) might have influenced colonization of the southern part of the Peninsula. To support that new populations are becoming established in the Peninsula is the fact that 80% of the records are of juvenile stages of the species, specifically larvae at artificial breeding sites and by monitoring ovitraps. The first record of *Ae. albopictus* at Campeche was from the community of Arroyo Negro, on the border of Quintana Roo and Guatemala. Specimens collected were female adult mosquitoes feeding on human blood at sunset (1800-1900 hours).

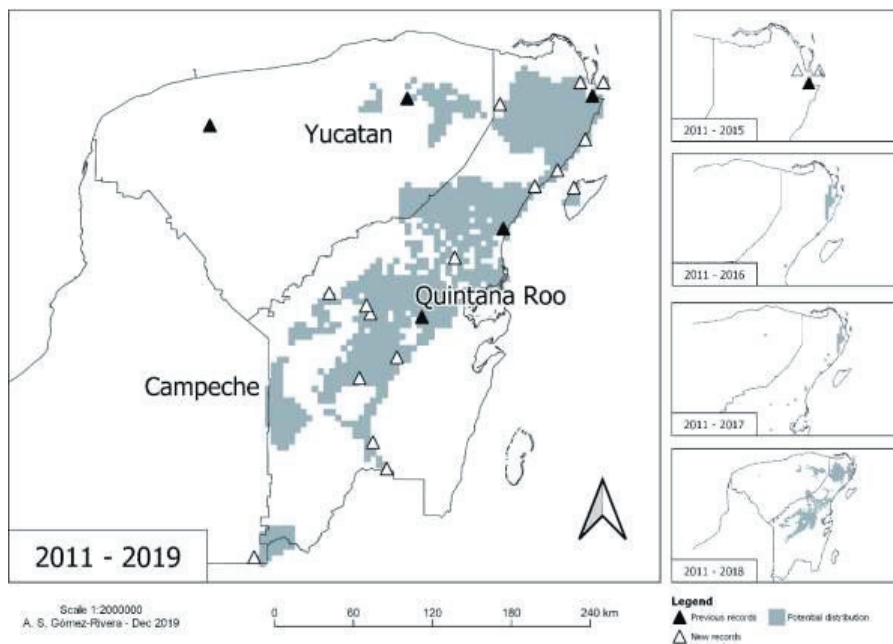


Fig. 1. Records and potential distribution of *Aedes albopictus* in the Yucatan Peninsula.

The presence of *Ae. albopictus* on the Peninsula could have a negative effect because prevention and control of dengue and other arboviruses are focused on *Ae. aegypti*. Installation of entomological surveillance for both mosquito species is recommended, and sampling efforts should focus on larval stages and use of ovitraps in peri-urban areas. More data at the local level are needed to understand population dynamics of *Ae. albopictus* and interaction with similar species like *Ae. aegypti* in urban areas and *Anopheles* spp. or *Culex* spp. in peri-urban and rural areas.

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