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SCIENTIFIC NOTE

NEW RECORD OF A*EDES ALBOPICTUS* IN A SUBURBAN AREA OF MERIDA, YUCATAN, MEXICO

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ABSTRACT. A survey was carried out in 51 households within a suburban area of Merida, Yucatan, Mexico, for 5 consecutive days. Adult collections were performed using Prokopack aspirators (indoors) and human-landing mosquito catches (HLC) outdoors, and larval sites (artificial containers) were revised for larvae collection. A total of 259 *Aedes albopictus* were collected, 246 from artificial larval sites, 8 by indoor aspiration, and 5 by HLC. This is the first record of *Ae. albopictus* in Merida, Yucatan, Mexico.

KEY WORDS *Aedes*, *Aedes aegypti*, control, Mexico, surveillance

In the last few decades, *Aedes albopictus* (Skuse) (the Asian tiger mosquito) has spread from the western Pacific and Southeast Asia to Europe, Africa, the Middle East, northern Australia, North and South America, and the Caribbean primarily via the global tire trade (Gratz 2004). Genetic evidence supports collection information that *Ae. albopictus* was introduced to Mexico principally by land from the USA and Central and South America (Pech-May et al. 2016). Larvae of *Ae. albopictus* were first collected in Mexico in the northern state of Tamaulipas in 1988 (CDC 1989) and in 1993 in the northern state of Coahuila, along the noncoastal region of the Mexico-USA border (Ibañez-Bernal and Martinez-Campos 1994). The species then dispersed progressively through the country. Currently, the distribution of *Ae. albopictus* has been confirmed in 12 states in Mexico (Chiapas, Coahuila, Hidalgo, Morelos, Nuevo Leon, Oaxaca, Puebla, Queretaro, Quintana Roo, San Luis Potosi, Tamaulipas, and Veracruz) (Casas-Martínez et al. 2012). Recently, Ortega-Morales et al. (2018) reported the presence of this species for the first time in the municipality of Tizimín (northeast of Yucatan state).

Along with *Aedes aegypti* (L.), *Ae. albopictus* has been implicated as a secondary vector for dengue virus, chikungunya virus, and Zika virus in Latin America (Medeiros et al. 2018). While *Ae. aegypti* is predominantly an urban vector, using artificial containers as breeding sites and feeding almost exclusively on humans (Powell and Tabachnick 2013), *Ae. albopictus* is more often found in suburban and rural areas, feeding on a variety of mammals (including humans) and birds (Delatte et al. 2008). *Aedes albopictus* is spreading rapidly to new areas/regions in Mexico, and now is an apt time to survey the extent to which this species is or might be found in Yucatan state.

An entomological survey was performed during the second week of October 2018 in San Pedro Nohpat (20.951514 N, –89.564964 W), a suburban area of Merida (the largest and capital city in Yucatan) that belongs to the municipality of Kanasin located 500 m away from Merida's beltway (Fig. 1). In this area, the average annual temperature is 26°C with an annual rainfall of 175 mm (INEGI 2010). The vegetation in the area consists of low deciduous forest with patches of secondary vegetation (Flores and Espejel 1994). Sampling was carried out during 5 straight days (October 15–19) and consisted of collecting the immature stages of mosquitoes in artificial sites such as plastic containers (buckets) and bags, bottles, discarded tires, etc. (Fig. 2). A spatially random selection of 51 houses nested in blocks was performed to capture the geography of the area (Deming et al. 2016). Indoor adult mosquito collections were performed between 9:00 a.m. and 1:00 p.m. by five 2-person teams using Prokopack aspirators (Vazquez-Prokopec et al. 2009). Collections were limited to a maximum of 15 min per team per household. Additionally, we used the human-landing mosquito catch (outside) (HLC). This

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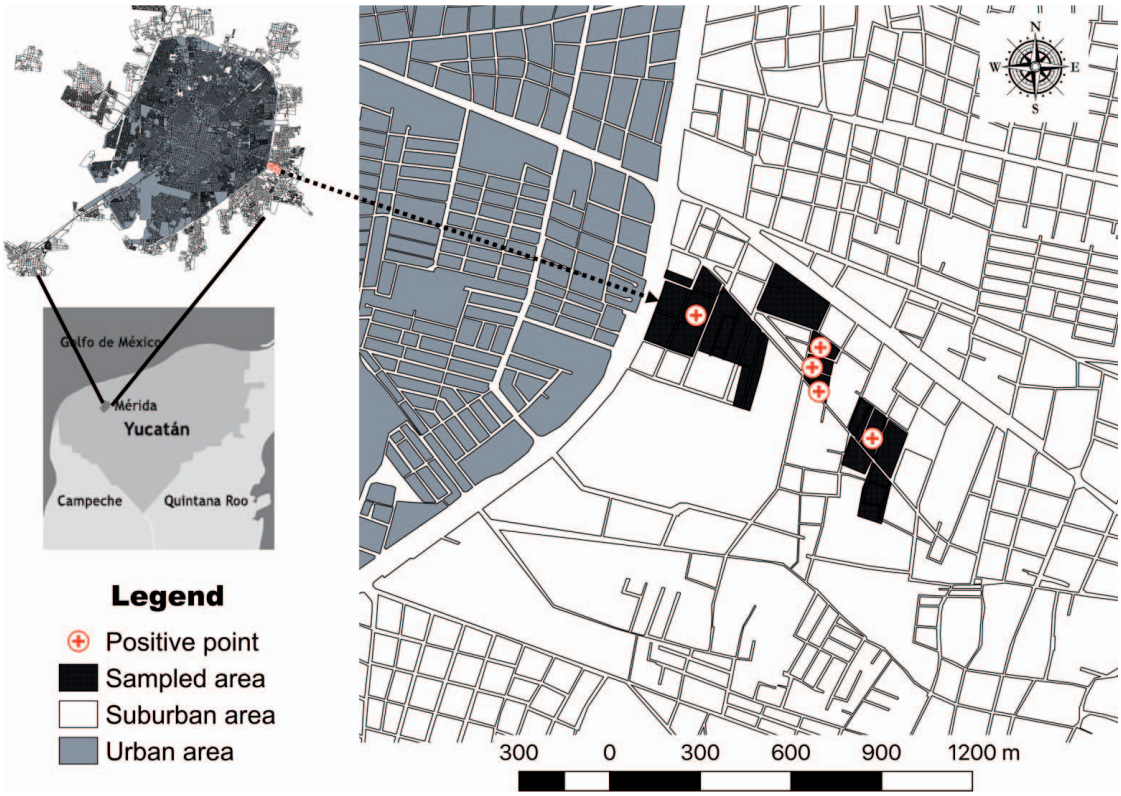

Fig. 1. Location of the suburban collection areas in Merida, Yucatan, Mexico.

method consists of sitting down with legs exposed and waiting for mosquitoes to come feed on collectors. The HLC (outdoor) was performed over 2 consecutive days between 6:00 and 8:00 p.m. by 4 volunteers (Ndiath et al. 2011). All collected larvae, and adult mosquitoes were transported to the Collaborative Unit for Entomological Bioassays (UCBE) at the Universidad Autonoma de Yucatan (UADY) for identification using standard taxonomic keys (Rueda 2004). As part of the vector control program protocol, a sample of larvae and adult specimens were sent to the National Reference Center at the Instituto de Diagnóstico y Referencia Epidemiológicos (InDRE) of the Mexican Ministry of Health.

This is the first report of *Ae. albopictus* in a suburban area of Merida City. A total of 259 specimens were collected, of which 246 were from artificial containers sites (mainly discarded tires), 8 from indoor adult collections, and 5 from HLC collection (outside). Additionally, 122 and 85 *Ae. aegypti* and *Culex quinquefasciatus* Say were collected from inside houses.

Ae. albopictus was found to be present in largely abandoned lots mainly covered with secondary vegetation. Limited trash collection along with improper disposal of waste has led to increased breeding sites for this species. Although *Ae. albopictus* appears to have expanded westward from Tizimín along the rural towns, the lack of confirmed samples from these rural areas raises the possibility that the 2015–2017 distribution of *Ae. albopictus* in northeast Yucatan (Tizimín) was the result of an unknown colonization event similar to those by which the species has occurred in several southern locations in Mexico (Ortega-Morales et al. 2018) and Central America (Calderón-Arguedas et al. 2011). It is known, however, that the majority of the *Ae. albopictus* introductions are due to the transportation of eggs in a dormant state (quiescence) in used tires (Clements 1992, Gratz 2004).

This information is important to public health authorities in Yucatan and Mexico as evidence of the need to increase surveillance and control of this species in suburban and rural areas. It is equally important for community education and an efficient waste collection system. In the newly infested states/countries and those threatened with the introduction of *Ae. albopictus*, there has been much concern that the mosquito's presence could lead to serious outbreaks of arbovirus diseases (this species is a competent vector for at least 22 arboviruses, notably all 4 serotypes of dengue) (Gratz 2004). It is important to consider the ecology of *Ae. albopictus* alongside that of *Ae. aegypti* when developing vector/disease control programs. Finally, we notified

Fig. 2. Female of *Aedes albopictus* resting in a discarded tire at San Pedro Nohpat, suburban area of Merida, Yucatan, Mexico.

the Ministry of Health in Yucatan of the presence of this invasive species. As a quick response, the vector control program in collaboration with the Collaborative Unit for Entomological Bioassays (UCBE) would conduct integral strategies for effective detection and control of the vector mosquito in urban and suburban areas in Yucatan.

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